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C. A. HULL

2,082,004

DISHWASHING MACHINE

Filed Nov. 29, 1933

3 Sheets-Sheet 1

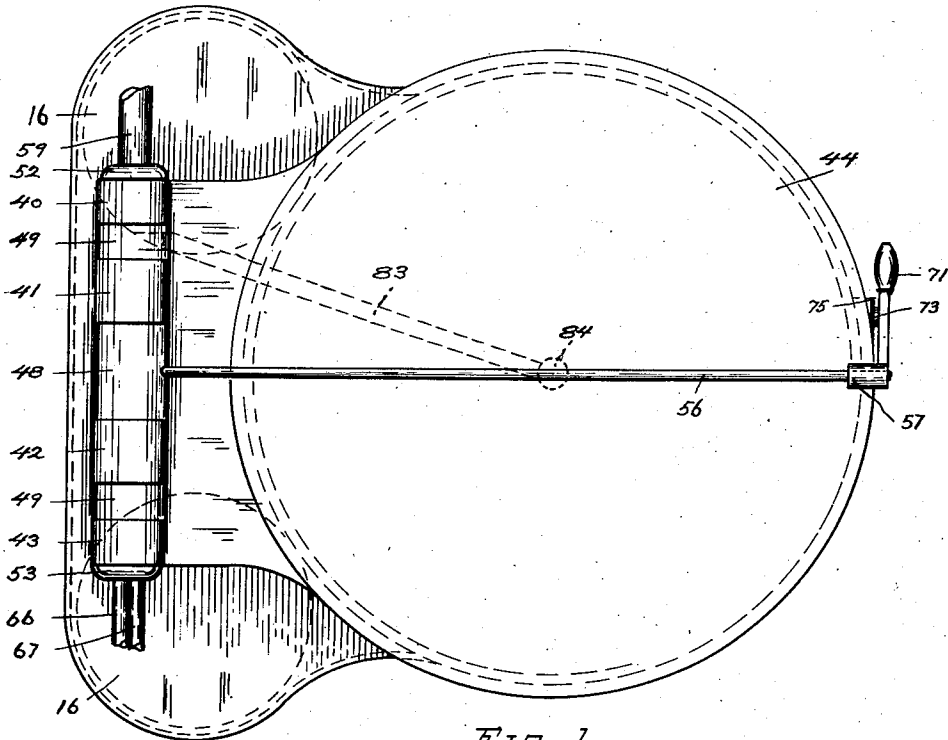


Fig 1

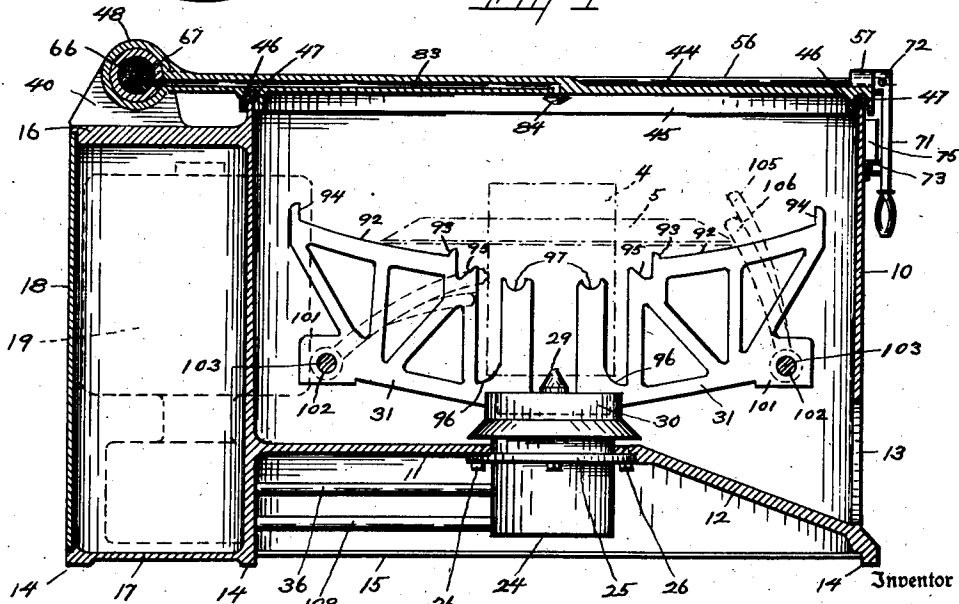


Fig 2

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Charles A. Hull.

John Thompson
Attorney

June 1, 1937.

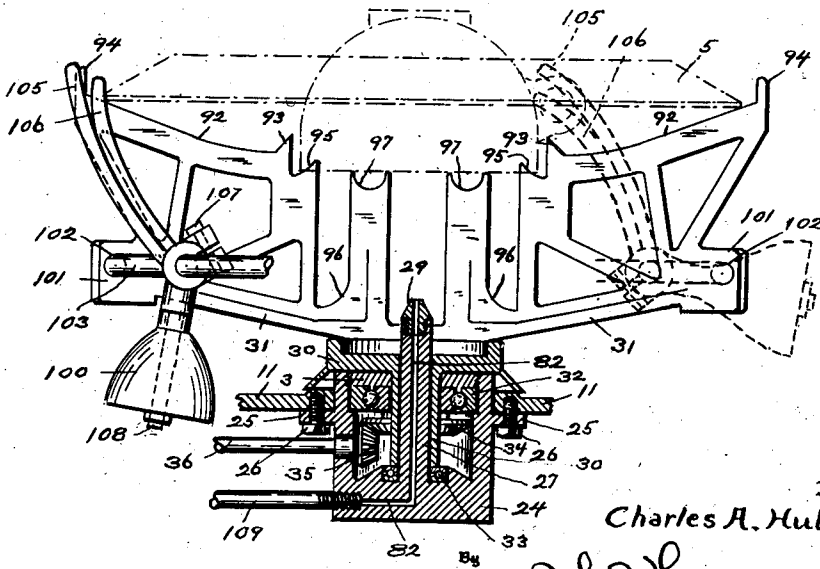
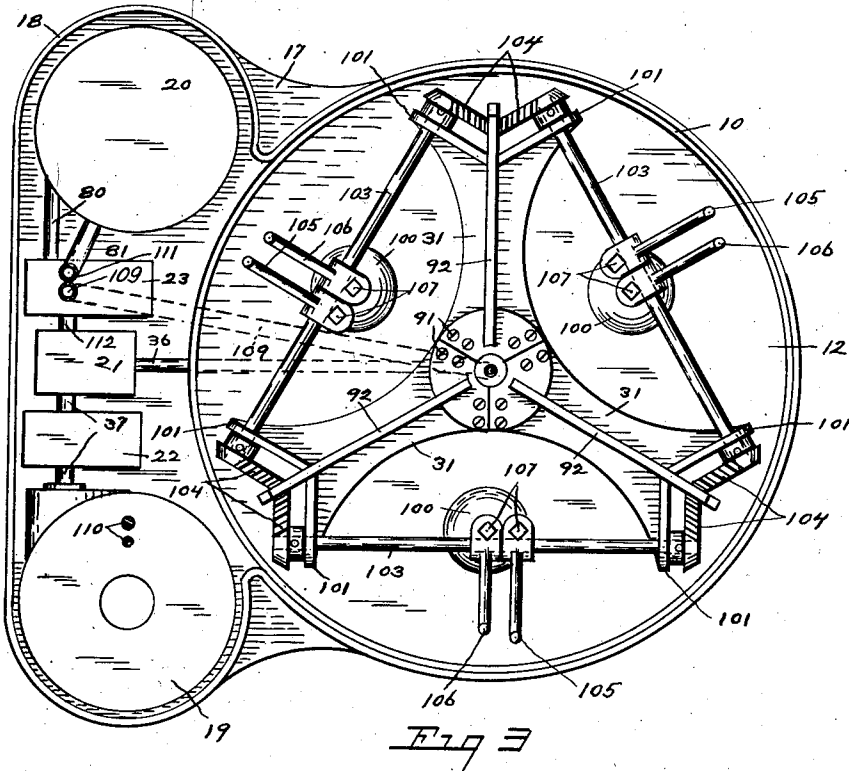
C. A. HULL

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3 Sheets-Sheet 2



Inventor

Charles A. Hull.

John Thompson

Attorney

June 1, 1937.

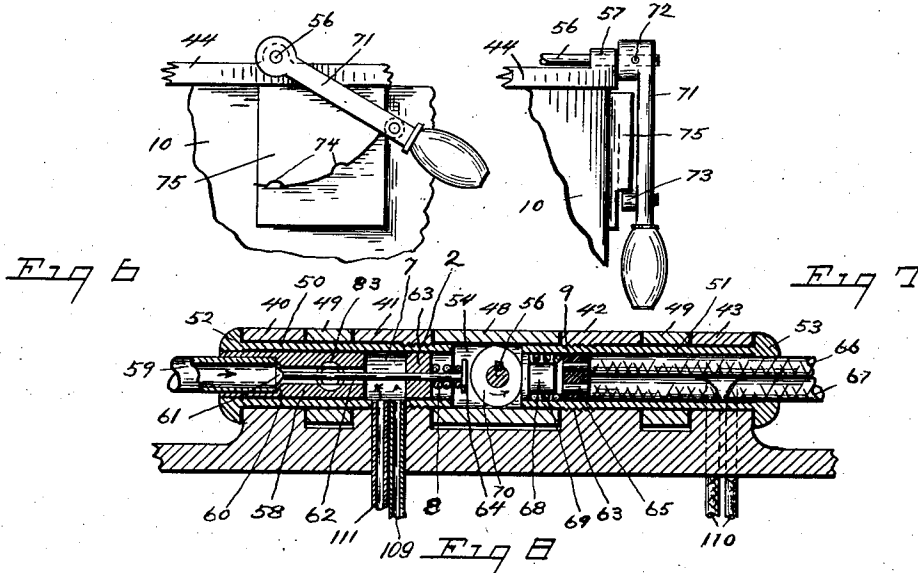
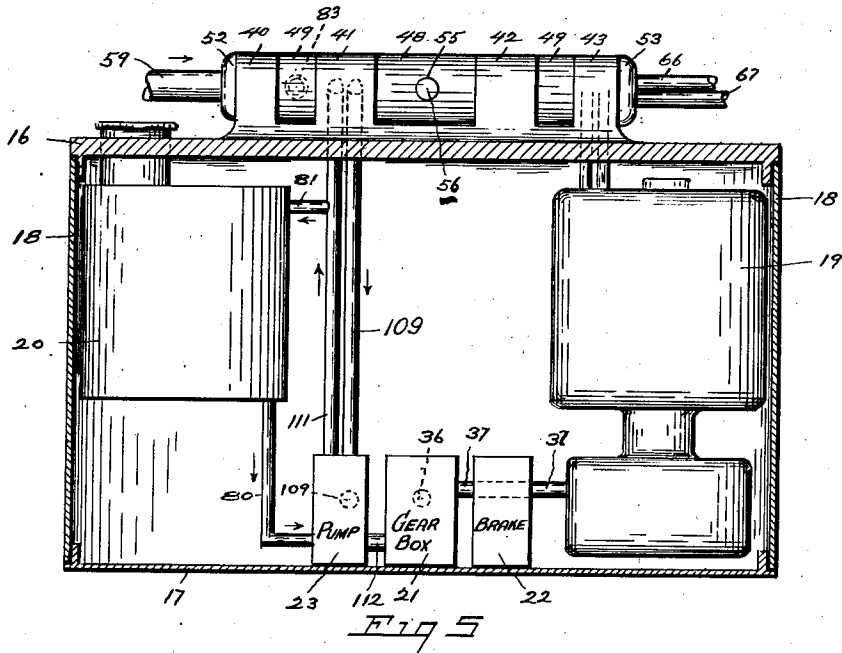
C. A. HULL

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3 Sheets-Sheet 3



Inventor

Charles A. Hull.

By

John Thompson

Attorney

UNITED STATES PATENT OFFICE

2,082,004

DISHWASHING MACHINE

Charles A. Hull, Poughkeepsie, N. Y.

Application November 29, 1933, Serial No. 700,165

6 Claims. (Cl. 141-9)

This invention relates to a machine for washing and drying receptacles, such as dishes, glasses, cups, and the like, and constitutes an improvement over the application for Patent Serial No. 578,660 filed on December 3, 1931, by Reeves Taylor and Charles A. Hull, and the present invention relates more particularly to a single compartment machine, wherein the receptacles are washed and dried in the same compartment.

In this invention I still adhere to the idea of washing and drying a single receptacle at a time, and this must not be confused with the usual method of placing a quantity of receptacles in a basket and subjecting them to the action of a cleansing fluid while being agitated in a washing chamber.

One of the objects of the invention is to provide means whereby one individual receptacle, such as a plate, dish, glass, cup or other receptacle may be placed in the machine and completely washed and dried in a few seconds; the same operation being repeated for each receptacle, thus reducing the danger of breakage, obviating the necessity and inconvenience of having to "pack" a large number of receptacles in a common basket or container, and insuring a perfectly clean and dry receptacle.

Another object of the invention is to provide means whereby the time required for washing and the drying may be varied by the operator to provide a longer washing time for very dirty receptacles than that required for slightly soiled ones, thus obviating having to wash a receptacle twice.

Another object of the invention is to provide means whereby the receptacles may be rotated upon their axis at a high rate of speed while being subjected, first to the cleansing action of a washing compound, and second to the rotating action through the air without the washing compound, whereby the moisture is removed from the surfaces of the receptacles and they become dry.

Another object is to provide an automatic means whereby each receptacle is centered on the supporting means and retained thereon during the washing and drying period, but may instantly be removed upon the stopping of the rotation of the receptacle carrier.

A further object of the invention is to provide means whereby the different operations of the machine are timed and controlled in their proper cyclic relations; that is, upon closing the cover and turning the hand locking lever, the electrical current that operates the motor to rotate the

receptacle support is turned on and by a further movement of the hand lever the cleansing liquid is admitted and directed against the inner and outer surfaces of the receptacle for the required length of time, and by a partial reverse movement of the hand lever the cleansing liquid is shut off and the receptacle still continues to be rotated by the support to remove the moisture therefrom and dry the same.

After this operation has been completed, by the full reverse movement of the hand lever the motor is stopped and the receptacle support brought to rest before the cover can be raised, and this same operation is repeated for each article to be washed and dried, the entire operation only requiring a few seconds to complete.

It is to be noted that throughout this specification that the word "receptacle" refers to either plates, dishes, cups, saucers, glasses and any other articles that can be washed in the machine.

In the drawings:

Figure 1 is a top plan view of the washing machine, showing the same with the cover in a closed position, and indicating in dotted lines the pipe that supplies cleansing liquid to the upper central spray nozzle.

Figure 2 is a vertical sectional view of the same, taken partly on the center line, but showing two arms of the receptacle support as being on the same vertical plane to better illustrate the method of holding the receptacle thereon, and also indicating in dotted lines, a small plate 5, and a glass 4, in position and also the position of the holding arms 105 and 106 for centering and retaining the same, but it must be understood that only one receptacle can be placed on the support and washed at a time.

Figure 3 is a horizontal view of the washer with the cover and top removed therefrom to expose the support for the receptacles, the centering and retaining arms, and indicating in dotted lines the position of a plate, and the relation of the arms thereto.

Figure 4 is an enlarged detail view, partly in section of the receptacle supporting means and its mounting and driving means, the two arms of the support that are shown being taken on the same vertical plane to better illustrate their shape and relation to the receptacles and the holding means.

Figure 5 is a rear view of the washer with the casing removed to expose the motor, soap container, pump, gear box and brake, and the piping for the cleansing fluid.

Figure 6 is an enlarged detail front view of the

hand operating and control lever showing its relation to the cover and main casing.

Figure 7 is a side view of the same.

Figure 8 is an enlarged detail sectional view of the cover hinge within which is mounted the controls for the motor and cleansing fluid.

Referring to the drawings:

The washer comprises the cylindrical casing 10, of suitable material such as metal and which is formed with the bottom 11 integral therewith and which is inclined as at 12 to a drain hole 13 formed in the front of the casing 10 and which may be provided with a suitable bag to receive the refuse or placed over the sink; said casing 10 is also provided with the feet 14 and the removable sheet metal bottom 15.

Adjacent the rear of the casing 10 and integral therewith is a top plate 16 formed with the rounded ends as shown, and a bottom plate 17 of similar design; these two plates 16 and 17 being joined together by a sheet metal casing 18, the ends of which are secured to the casing 10 in some suitable manner to allow the same to be removed for access to the operating parts that are mounted within the chamber thus provided outside of the washing compartment 10, and which comprise the electric motor 19 that is used to rotate the article support and operate the soap pump; the soap container 20; the gear-transmission box 21, the motor brake 22, and the soap pump 23, which are all of standard design and require no detailed description herein.

Within the bottom 11 and concentric with the casing 10 is mounted a gear casing 24 having a flange 25 which is secured to the bottom 11 by the bolts 26, the casing 24 projecting through said bottom 11, and within this gear casing 24 is formed a central upright 27 integral therewith and having a bore 82 and a spray nozzle 29 attached to the upper end thereof.

Mounted in a rotatable manner on this upright 27 is a member 30 which carries the receptacle support 31; said member 30 being carried on the bearings 32 and 33 mounted in the casing 24; and having mounted thereon a bevel gear 34 in mesh with and rotated by a bevel gear 35 which is mounted in the side wall of the casing 24 upon a drive shaft 36 extending from the gear box 21; said transmission gears in the box 21 being driven by the motor shaft 37 which passes through the brake 22 from the motor 19; which is here shown as mounted in a vertical manner, but which may be horizontal if desired; said casing 24 is also provided with an oil retaining ring 3, threaded therein.

The top cover plate 16 is formed with the hinge members 40, 41, 42 and 43 (see Figure 8) and the cover 44 is hinged thereto and is formed with the hinge members 48 and 49, and with the downwardly extending flanged edge 45 which is formed with a groove 46 within which is placed a sealing member 47 of rubber or other suitable material to effect a tight joint between the upper edge of the casing 10 and the cover 44 when the same is closed.

It will be seen that the top plate 16 is on a lower plane than the cover 44 to allow for the hinge members both on the plate 16 and the cover 44 and to better provide for the easy opening and closing of the cover 44.

The cover hinge members 48 and 49 fit between the hinge members on the plate 16 in the usual manner and are retained in place in a hingeable manner by the two pins 50 and 51;

said pins 50 and 51 are provided with the heads 52 and 53.

The cover hinge member 48 is hollow and formed with a bore 54 in axial relation with the bore of the other hinge members and the two tubular pins 50 and 51, and is also provided with a transverse bearing 55 within which is rotatably mounted the rear end of the operating rod 56 which extends forward over the cover 44 and through the bearing 57 formed on the front edge of the cover 44.

The hinge pin 50 is provided adjacent to its outer end with a tubular plug 58 to the outer end of which is attached the feed water pipe 59 from an ordinary household source of hot water; and within this tubular plug 58 is formed a valve seat 60 having a valve 61 mounted on the stem 62 which extends through a plug 63 placed in the end of the tubular pin 50 and having a head 64 and spring 8 between the head 64 and the plug 63 to retain the valve in a normally closed position. It will be noted that the inner end of the valve stem 62 and head 64 are within the bore 54 of the hinge member 48, and that there is a space 7 between the plug 58 and the plug 63 within which the soap mixes with the water before passing through the pipes 83 and 109, to the two spray nozzles.

The inner end of the tubular hinge pin 50 extends into the bore 54 of the cover hinge member 48 and has the threads 2 formed thereon which are threaded into the hinge member 41 in such a manner that the pin 50 is stationary in the hinge members 40 and 41, while the cover hinge members 48 and 49 turn thereon; said pin 50 is also formed with an opening in the side thereof which registers with a similar hole formed in the hinge member 49 within which is secured a water pipe 83 which passes through the cover plate 44 to the nozzle 84, to carry the mixed water and soap from the chamber 7.

The hinge pin 51 comprises a tubular pin having the head 53, the inner end extending into the bore 54 of the cover hinge member 48 and having the threads 63 threaded into the plate hinge member 42, so that said pin 51 is stationary in the plate hinge members 42 and 43 and movable in the cover hinge members 48 and 49; within this hinge pin 51 is mounted a plug 9 of insulating material having two electrical contacts 65 therein to which are attached the electrical feed wires 66 and 67, which supply current for the motor 19; the feed wire 67 being broken within the hinge member 49 and connected to the motor wires 110. Within the inner end of the pin 51 is slidably mounted a contact button 68 upon the spring 69 and adapted to be contacted with the contacts 65 to close the electrical circuit for the motor 19.

For operating this contact button 68 to first close the electrical motor circuit to rotate the article support, and then operate the valve 61 to admit the cleansing fluid to the washing compartment, there is mounted on the rear end of the operating rod 56 a cam 70 which upon being rotated, first contacts with the button 68 and then with the valve stem head 64. The rod 56 is operated by a hand lever 71 that is mounted on the forward end of the rod 56 adjacent the bearing 57 on the cover 44; said hand lever being held by a pin 72 and provided with a roller 73 adapted to engage with either of the notches 74 that are formed in the sector plate 75 attached to the front of the casing 10; this sector being of such shape that as the roller 73 moves along it the

cover 44 will be forced tightly down upon the casing 10 to provide a water tight fit.

The first or upper notch 74 indicating that the cam 70 has operated the button 88 to start the motor 19, and the second notch indicating that the cam 70 has operated the valve 61 to admit the cleansing fluid. In this way the operator may hold the hand lever 71 to the first position to rotate the receptacle carrier the required length of time before he admits the cleansing fluid, and then he may admit the cleansing fluid for the length of time that he considers necessary to wash the receptacle before stopping the flow of liquid and allowing the receptacle to be rotated in the warm air to dry the same, before stopping the motor and opening the washer to reload.

The shutting off of the cleansing liquid and the stopping of the motor is accomplished by the reverse movement of the hand lever 71 and before the cover 44 can be raised.

The brake is of the magnetic type and is operated by the opening of the motor circuit to insure that the receptacle carrier is brought to a stop before the cover 44 is opened.

The liquid soap from the container 20 is conveyed by the pipe 80 to the pump 23, which is operated by the shaft 112 from the gear box 21, and the soap is delivered in a small quantity by the pipe 111 to the chamber 7 where it mixes with the water entering through the valve 61, and conveyed by the pipes 109 and 83 to the spray nozzles; during the time that the valve 61 is closed, the soap is by-passed back to the tank 20 by the pipe 81.

As the receptacles are placed upon the support in an inverted manner, any refuse that they contain will at once, or upon the first rotations of the support drop down to the bottom and be washed out through the drain hole 13 provided for this purpose.

From the water pipe 111 which extends upward within the rear compartment the water and soap are conveyed by the pipe 83 to the nozzle 84 in the center of the cover 44, or to any other nozzles that may be provided in the sides of the casing 10, or in other parts of the cover 44; while a water pipe 109 extends downward and inward and conveys the water to the casing 24 and upward through the bore 82 to the nozzle 29, or to any other nozzles placed at other locations.

The carrier or support 31 for the receptacle is in the form of a three armed device (see Figures 2, 3 and 4) which are secured to the member 30 which rotates upon the upright 27 by the screws 91; said supporting arms being formed with the plate supporting surfaces or edges 92 terminating at their lower end with a spur 93 and at their upper end with a spur 94; the cup supporting notches 95; the glass supporting notches 96 and the small glass notches 97; all of these supporting edges and notches being so designed as to accommodate all of the standard sizes of the receptacles in this classification; that is the plate supporting edges will take all sizes of plates in common use; the cup notches will take all of the standard sizes of cups, etc.

For automatically centering the receptacles upon the supporting edges of the arms 31 and holding them thereon during the operation of washing and drying, I have provided the retaining arms 105 and 106 which are pivoted to arms 31 by the shafts 103 which are rotatably mounted in the bearings 102 of the lugs 101 formed on the arms 31; said arm 106 being provided with the weight 100; the arms 105 being slightly longer

than the arm 106, and both arms being slightly curved and set at an angle with each other so that in some cases the long arm will contact with the edge of the receptacle to center and hold it down, while in other cases the other arm will do the contacting, as shown by the dotted lines in the figures.

For actuating all of the arms 105 and 106 in unison the ends of the shafts 103 are geared together by the bevel gears 104, so that all of the shafts 103 move together by the action of the weights 100 which are mounted on the studs 108 secured to and projecting from the clamps 107 of the arm 106; thus as the support is rotated, the centrifugal force set up will cause the weights 100 to move outward and bring the arms 105 and 106 inward into a centering and holding relation with the receptacle on the support; sometimes one set of arms doing the centering by pushing the receptacle as the arms contact therewith, and sometimes the other set of arms depending upon the size and shape of the article; the centering action taking place upon the first few rotations of the carrier or as the weights move outward.

In the operation of the device, the electrical connection having been made to an outlet plug, the machine placed adjacent the sink and the hot water connection made, the operator turns the hand lever to the off position and raises the cover and inserts one receptacle upon the support in an inverted position, any refuse that may be on the receptacle thus dropping off; the cover is then closed and the handle lever moved toward the left, the roller engaging the curved sector which forces the cover down tightly to insure a water tight joint between the cover and the upper edge of the casing.

By a further movement of the hand lever towards the left the roller engages the first notch in the sector and the corresponding cam on the rear end of the operating rod will close the electrical circuit and start up the motor to rotate the receptacle support, the first rotations of which tend to remove the balance of the refuse and center the receptacle in the support and as the support gains momentum the weights on the arms will move outward and the arms will contact with the receptacle further centering the same and holding it in place during the operation of the machine.

Then by a final movement of the hand lever to the left the last notch is engaged by the roller and the cam will contact with and move the valve stem and open the valve to admit the mixture of soap and water to the nozzles which will direct the same against the upper and lower faces of the receptacle striking the entire surfaces and cleansing the same, the dirt and refuse being carried off through the drain hole.

The rotation of the support and the receptacle and the admission of the cleansing fluid having been continued for the required length of time to wash the article, the hand lever is moved in a reverse direction, which will first cut off the water supply while still permitting the support to be rotated which will remove the moisture from the receptacle and dry the same, and a further reverse movement of the hand lever will stop the motor, and its final movement will disengage the roller from the sector and allow the cover to be raised and the cleaned and dried receptacle to be removed and another put in its place and the operation repeated for each receptacle.

The movement of the hand lever to the off

position opening the electrical circuit and also operating the brake to stop the motor and thus the rotation of the support which will allow the weights to move inward and the arms outward to release the receptacle.

5 Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A food receptacle washer and dryer comprising a closed cylindrical casing, a cleaning fluid supply container attached thereto and having spray nozzles connected therewith for feeding liquid from the container, an upright mounted in said casing in axial relation thereto, a rotatable support mounted in said casing upon said upright for supporting and rotating the receptacle during the operation of washing and drying, a motor attached to said casing for rotating said support, means carried by said support for centering the receptacle thereon and holding the same in a rigid manner by the rotation of said support, a cover for said casing and means contained in said cover for starting and stopping said motor and regulating the injection of the cleaning liquid, through said nozzles.

2. A washing and drying machine for food receptacles, comprising a cylindrical casing having a hinged cover and formed with an inclined bottom having a drain opening, a cleaning liquid container attached to and forming a part of said casing, a mixing pump for the liquid, means for directing the liquid in the form of spray against the entire surface of the receptacle, a hollow upright mounted in said casing in axial relation therewith, a receptacle support rotatably mounted on said upright and means for rotating the same thereon, means carried by said support for centering the receptacle thereon and for retaining the same during the rotation of the same, a locking hand-lever for the cover mounted thereon and adapted to be manually moved, controls for the rotating means and the liquid, and means connected to said hand-lever for operating said controls.

3. In a food and drink receptacle washer and dryer, in combination with a casing of a rotatable receptacle support comprising a series of radial arms formed with upwardly and outwardly curved receptacle supporting upper edges having limiting stops at their outer ends,

means for centering and retaining a single receptacle upon said edges, comprising a series of levers pivoted to said radial arms and adapted to engage the receptacle, and means actuated by the rotation of the support for actuating said levers to retain them in contact with the receptacle.

4. In a food and drink receptacle washer and dryer, a casing having a receptacle support comprising a rotatable support therein having radial arms formed with receptacle engaging and centering contact edges, centering and retaining levers having horizontal pivotal connection with said arms and formed with a receptacle engaging end, weights secured on the other ends of said levers, and means for rotating said receptacle support whereby the levers will engage and retain the article upon the edges of the radial arms of the support during said rotation by the outward movement of the weights due to the centrifugal force set up by said rotation.

5. In a food or drink receptacle washer and dryer, a casing having a rotatable support therein comprising a series of radial arms formed with upwardly and outwardly curved receptacle supporting edges, limiting stops at their outer ends, means for centering and retaining a receptacle on said edges, comprising a series of levers pivoted to said radial arms and adapted to engage the receptacle, and means actuated by the rotation of the support for actuating the levers to retain the receptacle upon the edges of the radial supporting arms.

6. In a food or drink receptacle washer and dryer, a rotatable receptacle support comprising a series of radial arms formed with receptacle supporting and centering surfaces having limiting stops formed thereon, a series of shafts rotatably mounted in said arms, means rotatably engaging the ends of the shafts, each of said shafts extending between and rotatably connected with the arms, centering and retaining levers secured to said shafts and each formed with a receptacle engaging end, weights mounted on the other ends of said levers, and means for imparting movement to all of said levers by the rotation of the support, to contact with and hold the receptacle upon the support.

CHARLES A. HULL.