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2,908,598

METHOD AND APPARATUS FOR WASHING GLASS ARTICLES

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2 Sheets-Sheet 1

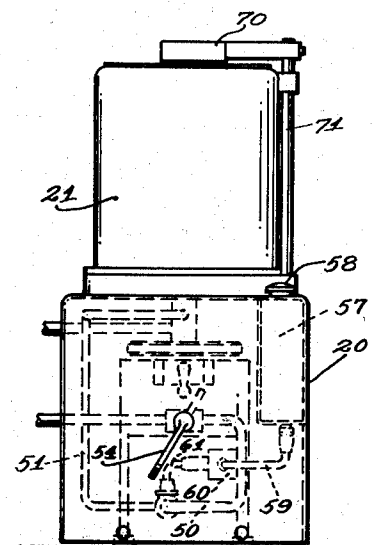


Fig. 1.

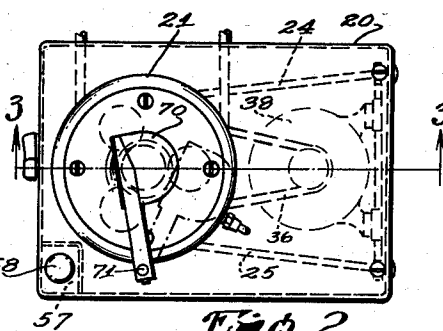


Fig. 2.

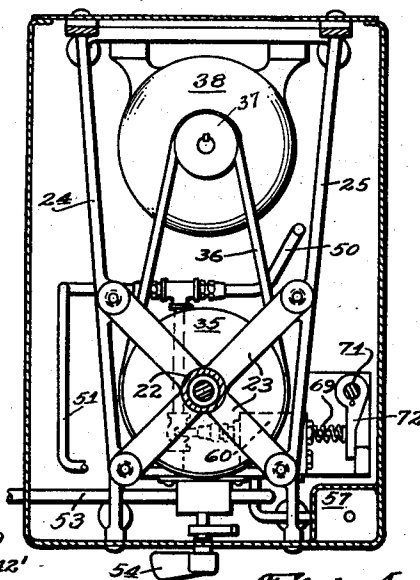


Fig. 4.

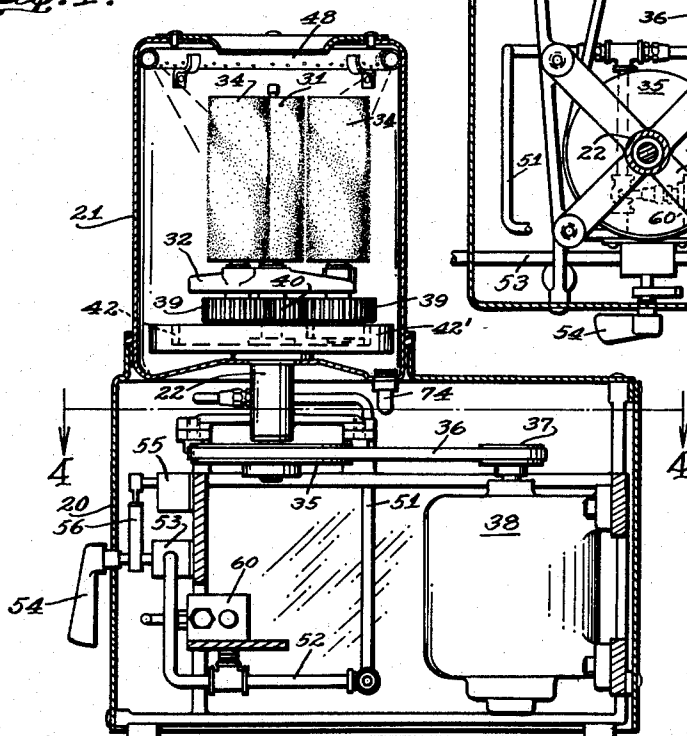


Fig. 3.

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2 Sheets-Sheet 2

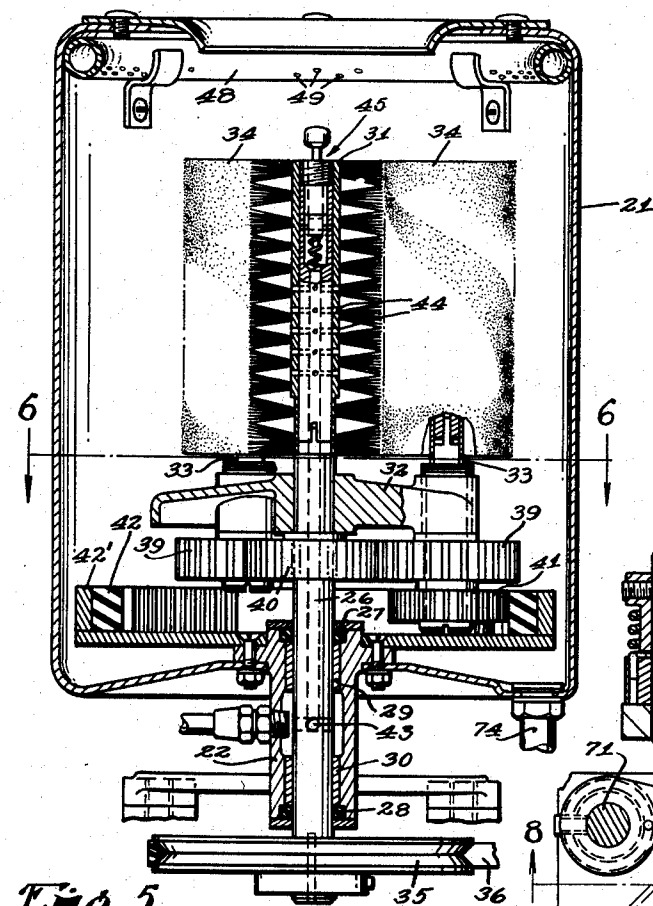


Fig. 5.

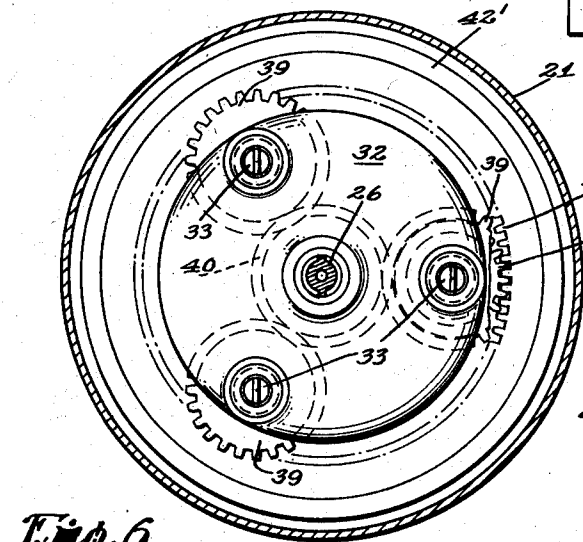


Fig. 6.



Fig. 10.

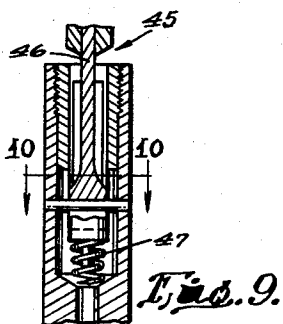


Fig. 9.

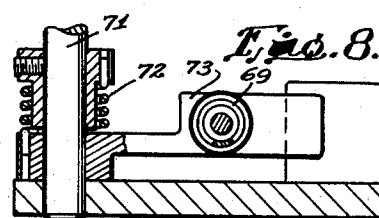


Fig. 8.

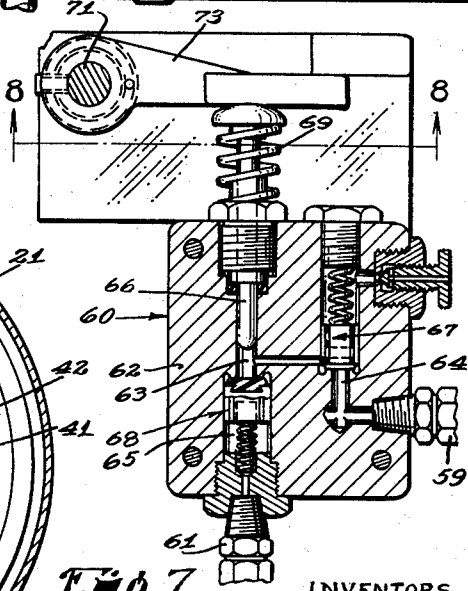


Fig. 7.

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METHOD AND APPARATUS FOR WASHING GLASS ARTICLES

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Application March 25, 1954, Serial No. 418,677

18 Claims. (Cl. 134—8)

This invention relates to washing apparatus, and particularly to a method and apparatus for washing glass tumblers and stemware.

The washing of glass articles in commercial food and beverage establishments poses difficult problems due to the tendency of food, beverages and cosmetics to adhere to the glass surfaces.

According to a currently used method of washing, the article is successively dipped into a series of solutions. This is not completely satisfactory since there is no assurance that all the foreign particles have been removed. Various brush devices have been developed to be placed in the solutions for facilitating the washing operation.

These prior methods offer certain definite disadvantages. First, the continuous reuse of the same washing solutions is not as desirable from the standpoint of sanitation as the use of a fresh solution for each washing operation. Second, there is no assurance that all the surfaces of the articles are washed thoroughly to remove all foreign particles. Third, it is often easy for the operator to omit one of the solutions, thus resulting in an improper washing operation. Fourth, the washing operation depends upon the degree of physical effort expended by the operator.

It is an object of this invention to provide a method and apparatus for washing glass tumblers and stemware wherein both the inner and outer surfaces of the article are thoroughly and quickly cleansed and rinsed.

It is a further object of this invention to provide an apparatus wherein the water and other materials used in the cleansing and rinsing are not reused but a fresh supply is used for each article.

It is a further object of this invention to provide an apparatus wherein the insertion of an article into the apparatus in position for washing and rinsing causes a measured charge of detergent and sterilizing liquid to be provided to the apparatus.

Another object of the invention is to provide an apparatus wherein the glass article is cleansed and rinsed as rapidly as it is inserted and removed from the apparatus, thus providing a very rapid washing operation.

Another object of the invention is to provide an apparatus wherein it is impossible to wash the article without having it subjected to the necessary solutions.

Another object of the invention is to provide a method and apparatus wherein no positive human force is required to retain the article in position while it is being cleansed and rinsed.

Other objects of the invention will appear hereinafter.

Referring to the accompanying drawings:

Fig. 1 is an elevational view of the apparatus;

Fig. 2 is a plan view of the apparatus;

Fig. 3 is a sectional elevational view at the line 3—3 on Fig. 2;

Fig. 4 is a sectional view at the line 4—4 on Fig. 3;

Fig. 5 is a fragmentary sectional view of a portion of the apparatus shown in Fig. 3, parts of the apparatus being broken away;

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Fig. 6 is a sectional view at the line 6—6 on Fig. 5;

Fig. 7 is a sectional view of the washing solution dispensing mechanism;

Fig. 8 is a sectional view at the line 8—8 on Fig. 7;

Fig. 9 is a fragmentary sectional view on an enlarged scale of a portion of the apparatus shown in Fig. 5; and

Fig. 10 is a sectional view at the line 10—10 on Fig. 9.

As shown in Fig. 1 the apparatus comprises a hollow base 20 on which is mounted a cylindrical casing 21, the upper end of which has an opening therein through which an inverted article such as a tumbler or article of stemware may be inserted to be washed. A hollow cylindrical casting 22 is mounted in an opening at the base of the casing 21 (Figs. 3, 5). As shown in Fig. 4, the casting 22 is mounted by means of arms 23 extending radially from the casting to cross-bars 24, 25 mounted on the base 20. Referring to Fig. 5, a shaft 26 extends upwardly through the casting 22 and a seal is formed by gaskets 27 and 28. Bushings 29 and 30 are mounted between the shaft and the casting.

A brush 31 is mounted on the upper end of the shaft 26 by means of a bayonet lock. A circular carrier plate 32 is keyed to the shaft 26 and short shafts 33 are mounted along the periphery thereof for free rotation relative to the plate. Brushes 34 are mounted on the upper end of the short shafts 33 by means of bayonet locks.

As shown in Figs. 3 and 5, the center shaft 26 and in turn the center brush 31 are rotated by means of a pulley 35 mounted on the lower end of the center shaft 26 and driven by a belt 36 and pulley 37 on the shaft of motor 38 mounted in the base 20.

The outer brushes are rotated by small gears 39 mounted on the short shafts 33 below the circular plate 32, and meshing with a center gear 40 keyed to the center shaft 26.

In addition to rotation of the center and peripheral brushes, provision is made for rotation of the peripheral brushes about the axis of the center brush. As shown in Figs. 5 and 6, this includes a small gear 41 keyed to the lower end of one of the short shafts 33 and meshing with a stationary internal gear 42 mounted on a fixed plate 42' bolted to the center casting 22.

Means is provided for forcing liquid through the center brush. As shown in Fig. 5 the center shaft 26 is hollow and has an opening 43 to the surface thereof communicating with the space in the casting 22 to which liquid may be supplied. Liquid flows through the center shaft 26 upwardly to the brush 31, the shaft of which is hollow. The brush is provided with a multiplicity of perforations or openings 44 in the side thereof through which the liquid may flow to the brushes. A valve 45 may be provided on the upper end of the brush to permit a flow of liquid upwardly into the bottom of the tumbler when the tumbler is inserted on the brush. As shown in Fig. 9, this valve 45 may include a small plunger 46 normally held in upward position by a spring 47. Upon being depressed the plunger moves downwardly permitting liquid to flow upwardly through the end of the brush.

Liquid, such as water, may be supplied to the peripheral brushes by means of a ring or pipe 48 extending around the upper surface of the cylindrical casing 21 and provided with a multiplicity of openings 49 for directing the liquid downwardly.

As shown in Figs. 3 and 4, the liquid is supplied to the ring 48 by a line 50, and liquid is supplied to the center brush through the hollow shaft 26 and casting 22 through line 51. Lines 50 and 51 merge into line 52 which leads to a source of liquid such as water. A valve 53 is provided in line 52 to control the flow of liquid. The valve is provided with a handle 54 projecting through the base 20. Provision is made for starting or stopping the motor, which rotates the brushes

at the same time that the water is turned on and off. This includes a switch 55 actuated by a lever 56 mounted on the shaft of the handle 54 so that when the handle is turned to control the valve, the switch 55 is actuated.

The apparatus includes means for supplying a measured quantity of a washing solution to the water. This includes a tank 57 mounted in one corner of the base and conveniently provided with a cap 58 through which the tank may be filled (Fig. 1). A line 59 extends between the tank and a valve 60, which in turn supplies the measured quantity of washing solution to the line 52 through a short line 61.

As shown in Fig. 7, the valve comprises a body 62 having a small cylindrical cavity 63 therein. A port 64 provides communication between the cavity 63 extending between the cavity and the line 59 leading to the tank 57 of washing solution. A port 65 of larger cross-section extends between the lower end of the cavity and the line 61 leading to the water line 52.

A small plunger 66 is mounted within the cylindrical cavity 63 and reciprocation thereof forces a measured quantity of the washing solution out of the cylindrical cavity through the port 65 to the water line 52.

A piston type, spring-loaded check valve 67 is positioned at a point along the port 64 to prevent the flow of washing solution back to the line 59. A second piston type, spring-loaded check valve 68 is positioned in the port 65 to prevent the flow of water from the line 61 back into the cylindrical cavity.

The plunger 66 is normally held in outward position by a spring 69. The plunger is actuated by an arm 70 (Figs. 1 and 2) normally positioned over the end of the center brush 31 and mounted on a vertical shaft 71. As shown in Fig. 8, the vertical shaft 71 is mounted on the top of the base and is rotatable about its axis against the action of a spring 72. A short horizontal arm 73 is mounted on the vertical shaft and movable therewith. When the arm 70 is moved out of its position overlying the end of the brush to permit the insertion of an article of glassware over the brush, the vertical shaft 71 is rotated moving the arm 73 and forcing the plunger 66 into the body of the valve to momentarily force a measured quantity of washing solution into the water line 52 through the line 61.

An open drain 74 is provided to remove all waste liquids as they reach the base of the casing 20.

The operation of the apparatus may be summarized as follows:

The rotation of the brushes and the continuous supplying of water to the center brush and the external surfaces of the peripheral brushes may be initiated by rotating the handle 54 which actuates the water valve 53 and simultaneously actuates the switch 55 to start the motor.

In order to insert an article of glassware in inverted position, the arm 70 is moved out of its position overlying the end of the center brush 31. This momentary movement of the arm causes a measured quantity of washing solution to be supplied to the water which is continuously sprayed on the interior and exterior surfaces of the glass article. Concurrent with the insertion of the container the small valve 45 on top of the center brush is depressed, permitting the liquids to flow upwardly against the interior of the inverted article.

During this operation the brushes are rotating about their axes, and in addition the peripheral brushes are rotating about the axis of the center brush thereby providing a scrubbing action on the entire interior and exterior surfaces of the glass article.

The construction of the apparatus is such that the tangential forces on the inner and outer surfaces of the glass article are equalized, and there is little or no tendency for the glass article to rotate about its axis while it is being cleansed and rinsed. As a result, very

little force is necessary on the part of the operator to maintain the article in position for cleansing and rinsing.

This is an important feature since if the forces on the tumbler are not equalized, a great force is needed to prevent the glass article from rotating. Sometimes the forces are such as to cause breakage of the article by twisting or torsion.

A factor in this equalization of the forces is the gearing wherein the peripheral brushes rotate in opposite directions from the direction of rotation of the center brush at a speed greater than the speed of rotation of the center brush. In addition, the peripheral brushes move about the axis of the center brush in the same direction of rotation of the center brush at a speed less than the speed of rotation of the center brush.

Upon removal of the article, the arm 70 is permitted to return to its original position overlying the end of the brush, and the apparatus is once again in position for the insertion of another glass article for washing.

Since the water is being continuously supplied and the brushes are being continuously rotated and the washing solution is momentarily supplied when the glass article is inserted, the washing operation is very rapid and can be repeated as fast as an operator can insert and remove the glass article.

Since a measured quantity of washing solution is injected into the continuously sprayed water when the arm 70 is moved to permit insertion of an article, it is impossible to wash an article in the apparatus without having a measured quantity of washing solution supplied to the interior and exterior surfaces of the article. It is thus impossible for the operator to omit a necessary solution.

The term "washing solution" as used herein is intended to cover any solution that is suitable for the purpose. We have found that a solution currently available and commercially known in the trade as a detergent-sanitizer is preferred as it provides the necessary cleansing and sanitizing action in one solution.

We have further found that the parts of the apparatus which come in contact with the washing solution should preferably be made of a corrosion-resistant material. For example, we have found that the gears 39, 40 and 41 are preferably made of formica or similar plastic material, the carrier plate 32 of bronze, and the internal gear 42 of hard rubber. This particular combination of materials in addition to being resistant to corrosion, provides for a very silent operating mechanism.

Modifications may be resorted to within the spirit and scope of the appended claims.

We claim:

1. An apparatus for washing glassware comprising a brush mounted for rotation about its axis, means for rotating said brush about its axis, a multiplicity of brushes mounted about the periphery of the first brush for rotation about their respective axes, means for rotating each of the said peripheral brushes about its axis, means for moving said peripheral brushes in a closed path about the axis of the first brush during the rotation of the brushes, means for continuously supplying water to the interior and exterior surfaces of an article of glassware placed in inverted position on the first brush, and means for introducing a measured quantity of a washing solution to the continuously supplied water comprising a chamber containing said washing solution and connected to the means for continuously supplying the water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, and means overlying the end of the first brush and operatively connected to the valve whereby when said means is moved away from the brush to place an article in inverted position on the first brush the valve is actuated to introduce a measured quantity

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of the washing solution to the means for continuously supplying water.

2. An apparatus for washing glassware comprising a brush mounted for rotation about its axis, means for rotating said brush about its axis, a multiplicity of brushes mounted about the periphery of the first brush for rotation about their respective axes, means for rotating each of the said peripheral brushes about its axis, means for moving said peripheral brushes in a closed path about the axis of the first brush during the rotation of the brushes, means for continuously supplying water to the interior and exterior surfaces of an article of glassware placed in inverted position on the first brush, and means for introducing a measured quantity of a washing solution to the continuously supplied water comprising a chamber containing said washing solution and connected to the means for continuously supplying water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, an arm movable into and out of position overlying the end of the first brush, and interconnecting means between said arm and said valve whereby when the arm is moved from its position overlying the first brush in order that an article may be placed on the first brush, the valve is actuated to introduce a measured quantity of the washing solution to the means for continuously supplying water.

3. An apparatus for washing glassware comprising a brush mounted for rotation about its axis, means for rotating said brush about its axis, a multiplicity of brushes mounted about the periphery of the first brush for rotation about their respective axes, means for rotating each of the said peripheral brushes about its axis, means for moving said peripheral brushes in a closed path about the axis of the first brush during the rotation of the brushes, means for continuously supplying water to the interior and exterior surfaces of an article of glassware placed in inverted position on the first brush, and means for introducing a measured quantity of a washing solution to the continuously supplied water comprising a chamber containing a washing solution and connected to the means for continuously supplying the water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, said valve comprising a body having a cylindrical cavity therein and an inlet port providing communication between the exterior of the body and the cylindrical cavity through which washing solution may flow from the chamber to the cylindrical cavity, said body having an outlet port providing communication between the cylindrical cavity and the means for continuously supplying the water, a piston reciprocable within said cylindrical cavity, a one-way valve positioned in the inlet port to prevent the flow of washing solution back to the chamber, a second one-way valve in the outlet port to prevent the flow of water from the means for continuously supplying the water to the cylindrical cavity, an arm overlying the end of the first brush and movable into and out of position, interconnecting means between said arm and said piston whereby when the arm is moved the piston is displaced causing a measured quantity of washing solution to flow from the tubular cavity to the means for continuously supplying the water.

4. An apparatus for washing glassware comprising a central vertical shaft, a brush mounted on said shaft, said shaft being hollow whereby liquids may be supplied through said shaft to said brush, a multiplicity of brushes mounted about the periphery of the first brush with their axes parallel to the axis of the first brush, a motor, interconnecting means between the motor and the brushes for rotating the brushes about their axes and moving the peripheral brushes in a closed path about the axis of the first brush, means for continuously spraying water on the external surfaces of an article of glassware placed in inverted position on the center brush, means for con-

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tinuously supplying water to said hollow main shaft and to said means for spraying water on the exterior surfaces of the article, and means for momentarily introducing a measured quantity of a washing solution to the water as it is being supplied continuously to the hollow shaft and means for spraying the water.

5. An apparatus for washing glassware comprising a central vertical shaft, a brush removably mounted on said shaft, said shaft being hollow whereby liquids may be supplied through said shaft to said brush, means for rotating said shaft, a carrier plate mounted for free rotation on said shaft, an annular series of short shafts mounted for free rotation on said carrier plate, a brush removably mounted on each of said shafts, the axis of each said brush being parallel to the axis of the brush mounted on said center shaft, a gear mounted on each short shaft, a gear mounted on the main shaft for rotation therewith and meshed with the gears on the short shafts whereby when the main shaft is rotated to rotate the brush thereon the brushes mounted on the carrier plate are also rotated in a direction opposite to that in which the center brush is rotated, a stationary internal gear, a small gear mounted on one of said short shafts and meshing with said internal gear whereby when said short shaft is rotated the small gear is caused to track around the internal gear and rotate the carrier plate about the main shaft moving the brushes mounted on the carrier plate about the axis of the center brush, means for continuously spraying water on the external surfaces of an article of glassware placed in inverted position on the center brush, means for continuously supplying water to said hollow main shaft and to said means for spraying water on the exterior surfaces of the article, and means for introducing a measured quantity of a washing solution to the continuously supplied water.

6. The apparatus set forth in claim 5, said means for introducing a measured quantity of a washing solution comprising a chamber containing said washing solution and connected to the means for continuously supplying the water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, and means overlying the end of the first brush and operatively connected to the valve whereby when said means is moved away from the brush to place an article in inverted position on the first brush the valve is actuated to introduce a measured quantity of the washing solution to the means for continuously supplying water.

7. The apparatus set forth in claim 5, said means for introducing a measured quantity of a washing solution comprising a chamber containing said washing solution and connected to the means for continuously spraying the water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, an arm overlying the end of the first brush, and interconnecting means between said arm and said valve whereby when the arm is moved from its position overlying the first brush in order that an article may be placed on the first brush, the valve is actuated to introduce a measured quantity of the washing solution to the means for continuously supplying water.

8. The apparatus set forth in claim 5, said means for introducing a measured quantity of a washing solution comprising a chamber containing a washing solution and connected to the means for continuously supplying the water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, said valve comprising a body having a cylindrical cavity therein and an inlet port providing communication between the exterior of the body and the cylindrical cavity through which washing solution may flow from the chamber to the cylindrical cavity, said body having an outlet port providing communication between the cylindrical cavity and the means

for continuously supplying the water, a piston reciprocable within said cylindrical cavity, a one-way valve positioned in the inlet port to prevent the flow of washing solution back to the chamber, a second one-way valve in the outlet port to prevent the flow of water from the means for continuously supplying the water to the cylindrical cavity, an arm overlying the end of the first brush and movable into and out of position, interconnecting means between said arm and said piston whereby when the arm is moved the piston is displaced causing a measured quantity of washing solution to flow from the tubular cavity to the means for continuously supplying the water.

9. An apparatus for washing glassware comprising a central vertical shaft, a brush removably mounted on said shaft, said shaft being hollow whereby liquids may be supplied through said shaft to said brush, means for rotating said shaft, a carrier plate mounted for free rotation on said shaft, an annular series of short shafts mounted for free rotation on said carrier plate, a brush removably mounted on each of said shafts, the axis of each said brush being parallel to the axis of the brush mounted on said center shaft, a gear mounted on each short shaft, a gear mounted on the main shaft for rotation therewith and meshed with the gears on the short shafts whereby when the main shaft is rotated to rotate the brush thereon the brushes mounted on the carrier plate are also rotated in a direction opposite to that in which the center brush is rotated, a stationary internal gear, and a small gear mounted on one of said short shafts and meshing with said internal gear whereby when said short shaft is rotated the small gear is caused to track around the internal gear and rotate the carrier plate about the main shaft moving the brushes mounted on the carrier plate about the axis of the center brush.

10. In a method of washing articles of glassware wherein an inverted article is placed over a brush with a multiplicity of brushes positioned around the periphery of the brush in contact with the outer surface of the article, the steps which comprise rotating the inner brush about its axis, simultaneously rotating the peripheral brushes about their axes at a speed greater than the speed of rotation of the center brush and in a direction opposite to the direction of rotation of the center brush, moving the peripheral brushes in a closed path about the axis of the center brush at a speed less than the speed of rotation of the center brush and in the same direction as the direction of rotation of the center brush, continuously spraying water on the interior and exterior surfaces of the article when the article is in place on the rotating brushes, and momentarily supplying a measured quantity of washing solution to the water which is being continuously sprayed on the article in place on the rotating brushes, continuing the rotation of the brushes and the spraying of the water until the quantity of washing solution has been completely sprayed on the article and rinsed therefrom, and removing the article from contact with the brushes.

11. In an apparatus for washing glassware wherein an article of glassware is inserted in inverted position on a brush, means for continuously supplying water to the interior and exterior surfaces of the article, and means for introducing a measured quantity of a washing solution to the continuously supplied water, said latter means comprising a chamber containing said washing solution and connected to the means for continuously supplying the water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, and means overlying the end of the brush and operatively connected to the valve whereby when said means is moved away from the brush to place an article in inverted position on the brush the valve is actuated to introduce a measured quantity of the washing solution to the means for continuously supplying water.

12. In an apparatus for washing glassware wherein an article of glassware is inserted in inverted position on a brush, means for continuously supplying water to the interior and exterior surfaces of the article, and means for introducing a measured quantity of a washing solution to the continuously supplied water, said latter means comprising a chamber containing said washing solution and connected to the means for continuously supplying water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, an arm movable into and out of position overlying the end of the brush, and interconnecting means between said arm and said valve whereby when the arm is moved from its position overlying the brush in order that an article may be placed on the brush, the valve is actuated to introduce a measured quantity of the washing solution to the means for continuously supplying water.

13. In an apparatus for washing glassware wherein an article of glassware is inserted in inverted position over a brush, means for continuously supplying water to the interior and exterior surfaces of the article, and means for introducing a measured quantity of a washing solution to the continuously supplied water, said latter means comprising a chamber containing a washing solution and connected to the means for continuously supplying the water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, said valve comprising a body having a cylindrical cavity therein and an inlet port providing communication between the exterior of the body and the cylindrical cavity through which washing solution may flow from the chamber to the cylindrical cavity, said body having an outlet port providing communication between the cylindrical cavity and the means for continuously supplying the water, a piston reciprocable within said cylindrical cavity, a one-way valve positioned in the inlet port to prevent the flow of washing solution back to the chamber, a second one-way valve in the outlet port to prevent the flow of water from the means for continuously supplying the water to the cylindrical cavity, an arm overlying the end of the brush and movable into and out of position, interconnecting means between said arm and said piston whereby, when the arm is moved, the piston is displaced causing a measured quantity of washing solution to flow from the tubular cavity to the means for continuously supplying the water.

14. An apparatus for washing glassware comprising a central vertical shaft, a brush removably mounted on said shaft, said shaft being hollow whereby liquids may be supplied through said shaft to said brush, means for rotating said shaft, a carrier plate mounted for free rotation on said shaft, an annular series of short shafts mounted for free rotation on said carrier plate, a brush removably mounted on each of said shafts, the axis of each said brush being parallel to the axis of the brush mounted on said center shaft, a gear mounted on each short shaft, a gear mounted on the main shaft for rotation therewith and meshed with the gears on the short shafts whereby when the main shaft is rotated to rotate the brush thereon the brushes mounted on the carrier plate are also rotated in a direction opposite to that in which the center brush is rotated, a stationary internal gear, a small gear mounted on one of said short shafts and meshing with said internal gear whereby when said short shaft is rotated the small gear is caused to track around the internal gear and rotate the carrier plate about the main shaft moving the brushes mounted on the carrier plate about the axis of the center brush, means for spraying water on the external surfaces of an article of glassware placed in inverted position on the center brush, means for supplying water to said hollow main shaft and to said means for spraying water on the exterior surfaces of the article, and means for introducing

a measured quantity of a washing solution to the supplied water.

15. An apparatus for washing glassware comprising a central vertical shaft, a brush mounted on said shaft, said shaft being hollow whereby liquids may be supplied through said shaft to said brush, means for rotating said shaft, a carrier plate mounted for free rotation on said shaft, an annular series of shafts mounted for free rotation on said carrier plate, a brush mounted on each of said annular series of shafts, the axis of each said brush being parallel to the axis of the brush mounted on the center shaft, a gear mounted on each of said annular series of shafts, a gear mounted on the center shaft for rotation therewith and meshed with the gears on the annular series of shafts whereby when the center shaft is rotated to rotate the brush thereon the brushes mounted on the carrier plate are also rotated in a direction opposite to that in which the center brush is rotated, a stationary internal gear, a small gear on one of said annular series of shafts and meshing with said internal gear whereby when the said shaft on which said small gear is mounted rotates the small gear is caused to track around the internal gear and rotate the carrier plate about the main shaft moving the brushes mounted on the carrier plate about the axis of the center shaft, means for spraying water on the external surfaces of an article of glassware placed in inverted position on the center brush, means for supplying water to said hollow main shaft and to said means for spraying water on the exterior surfaces of the article, and means for introducing a measured quantity of a washing solution to the supply of water.

16. An apparatus for washing glassware comprising a central vertical shaft, a brush mounted on said shaft, said shaft being hollow whereby liquids may be supplied through said shaft to said brush, a multiplicity of brushes mounted about the periphery of the first brush with their axes parallel to the axis of the first brush, a motor, interconnecting means between the motor and the brushes for rotating the brushes about their axes and moving the peripheral brushes in a closed path about the axis of the first brush, means for spraying water on the external surfaces of an article of glassware placed in inverted position on the center brush, means for supplying water to said hollow main shaft and to said means for spraying water on the exterior surfaces of the article, and means for momentarily introducing a measured quantity of a washing solution to the water as it is being supplied to the hollow shaft and the means for spraying the water whereby an article of glassware placed on the center brush is

continuously subjected to water and momentarily subjected to a mixture of water and washing solution.

17. In an apparatus for washing glassware wherein an article of glassware is inserted in inverted position on a brush, means for supplying water to the interior and exterior surfaces of the article, and means for introducing a measured quantity of a washing solution to the supplied water, said latter means comprising a chamber containing said washing solution and connected to the means for supplying the water, a valve interposed between the chamber and the latter means and operable to introduce a measured quantity of the washing solution, and means overlying the end of the brush and operatively connected to the valve whereby when said means is moved away from the brush to place an article in inverted position on the brush the valve is actuated to introduce a measured quantity of the washing solution to the means for supplying water.

18. In a method of washing articles of glassware wherein an inverted article is placed over a brush with a multiplicity of brushes positioned around the periphery of the brush in contact with the outer surface of the article, the steps which comprise rotating the inner brush about its axis, moving the peripheral brushes in a closed path about the axis of the center brush, continuously spraying water on the interior and exterior surfaces of the article when the article is in place on the rotating brush, momentarily supplying a measured quantity of washing solution to the water which is being continuously sprayed on the article in place on the rotating brush, continuing the rotation and movement of the brushes and the spraying of the water until the quantity of washing solution has been completely sprayed on the article and rinsed therefrom, and removing the article from contact with the brushes.

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