

March 8, 1955

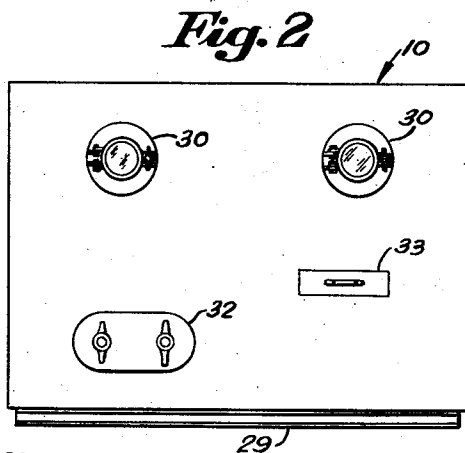
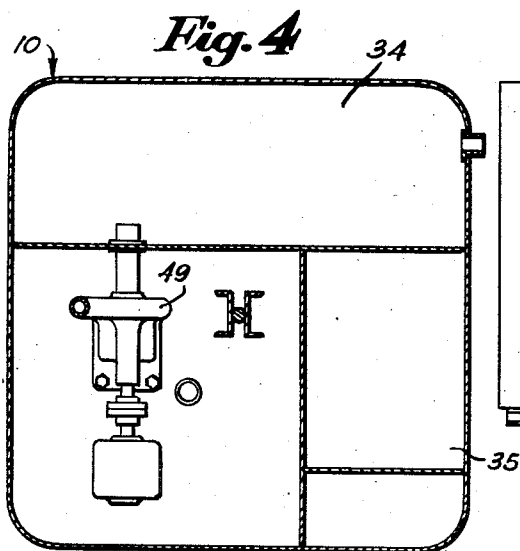
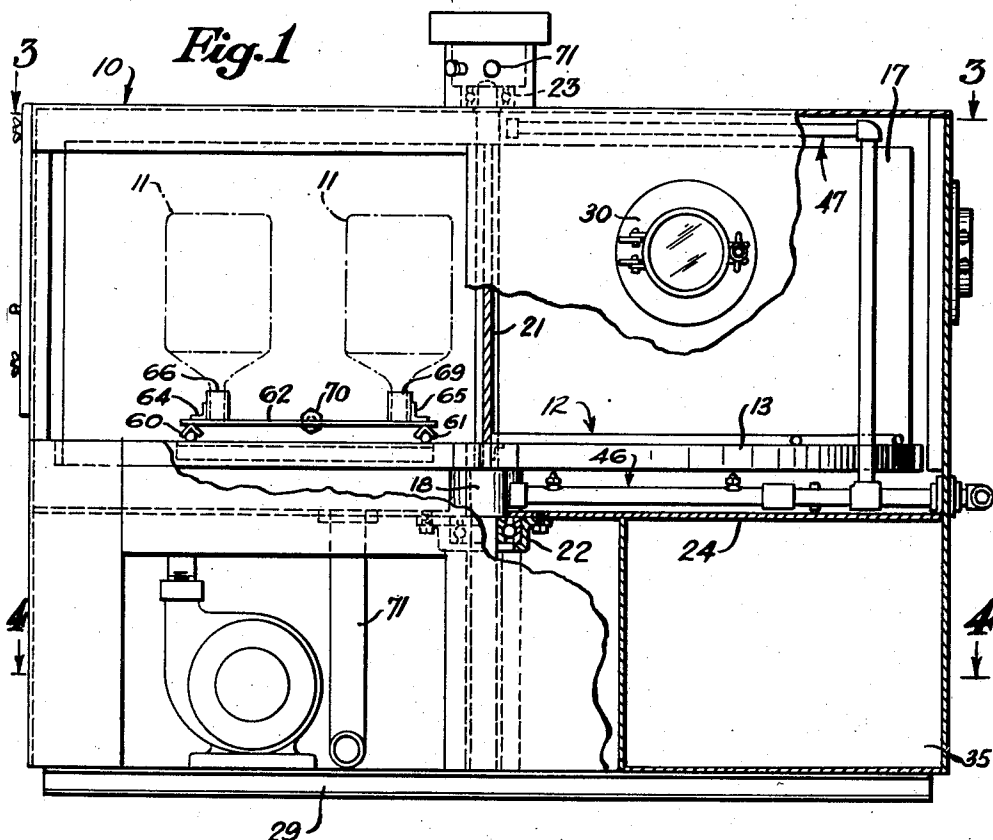
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2,703,580

DEVICE FOR CLEANING GLASSWARE

Filed Feb. 3, 1951

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

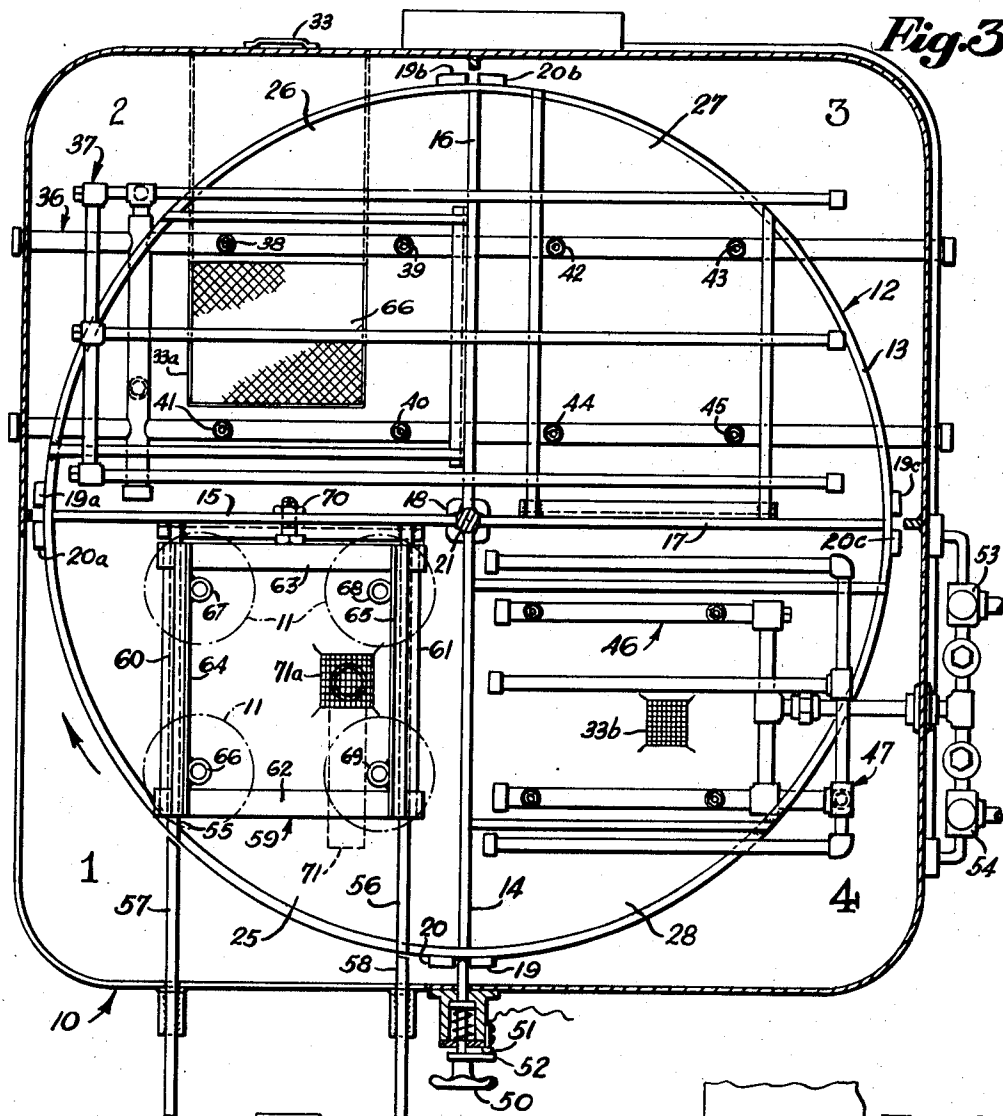


Fig. 3

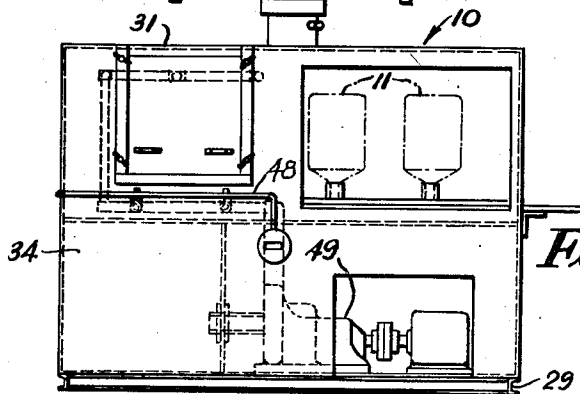


Fig. 5

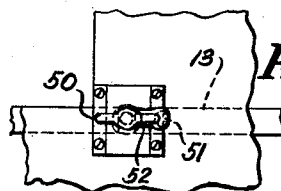


Fig. 6

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3 Sheets-Sheet 3

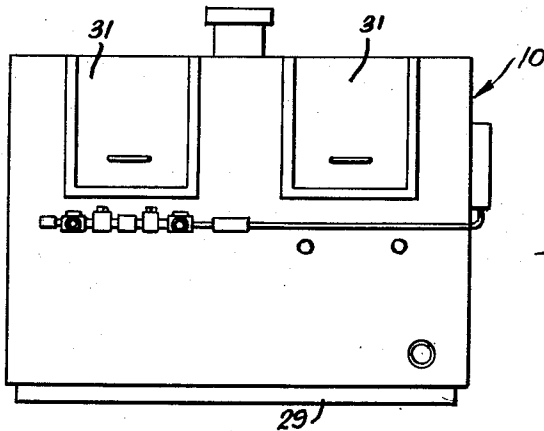


Fig. 7

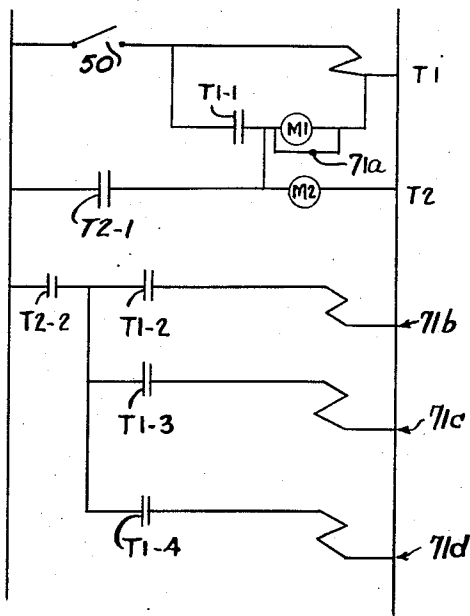


Fig. 8

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2,703,580

DEVICE FOR CLEANING GLASSWARE

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Application February 3, 1951, Serial No. 209,311

4 Claims. (Cl. 134—58)

This invention relates to a device for washing and rinsing or washing, rinsing, and drying any type, size, or shape of receptacle or glass containers such as laboratory glassware, bottles, and television tubes.

The recognized method for washing glassware of the type described consists of spraying a washing solution into the glassware in inverted position, the glassware being handled singularly or in similar groups.

It is an object of this invention to reduce the space required for such cleaning operations.

A further object is to provide a device that will handle glassware in assorted groups.

It is also an object of the instant invention to decrease operating and maintenance costs in cleaning glassware of the type described.

Other objects of the instant invention will become apparent in the course of the following specification.

In the attainment of these objectives, the device is constituted by a carrier for the receptacles or glassware, the carrier being rotatably mounted in a horizontal plane. The carrier is divided into four similar compartments, one of which is in a receiving and delivering position when the other three are in treating or processing positions. The receptacles are inserted in an inverted position in the receiving position of the carrier and then revolved successively between pairs of coaxing headers arranged above tanks. In the first treating position, the pairs of headers direct a washing solution into and over the receptacles. In the next treating position, the receptacles may be subjected to a second washing operation or to a rinsing treatment. The third position may be a rinsing position or merely a drying position. The washing and rinsing liquids are forced through the headers by an electric pump or pumps which by including a known timer in the circuit provides an adjustable over-all time interval for the treatment in each position as well as a variable intermittent operation during the over-all time period. After the tray has been revolved by the carrier through the various treatment positions, the processed receptacles and tray are removed from the receiving and delivering position and another tray with dirty receptacles inserted for a repetition of the cycle.

The invention will appear more clearly when taken in conjunction with the accompanying drawings showing by way of example a preferred embodiment of the inventive concept.

In the drawings:

Figure 1 is a front elevational view of the device in part section and constructed in accordance with the principles of this invention;

Figure 2 is a rear elevational view of the device shown in Figure 1 but on a reduced scale;

Figure 3 is a plan view on 3—3 of Figure 1;

Figure 4 is a plan view on 4—4 of Figure 1, on a reduced scale;

Figure 5 is a left side view of the device shown in Figure 1, also on a reduced scale;

Figure 6 is a fragmentary elevational view of the indexing mechanism controlling the proper positioning of the carrier of the device in the various positions;

Figure 7 is a right side view of the device shown in Figure 1, also on a reduced scale; and

Figure 8 is a schematic view of the wiring diagram for timing the over-all and intermittent operations of the sprays in the treating positions.

Referring now in greater detail to the drawings where

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like reference numerals indicate like parts, reference numeral 10 indicates the device, and 11 the receptacle or glassware to be cleaned.

The device 10 is constituted of a rotatably mounted carrier 12 which is constituted of a rim 13 divided into four quadrants by the radially directed vertical partitions 14, 15, 16, and 17 (Figs. 1 and 3). The partitions 14 and 16 as well as the partitions 15 and 17 are in straight angle arrangement and are attached at the inner ends in any known manner to the shaft 21. At the outer ends, the vertical partitions are attached at the bottom to the rim 13. On the outside of the rim and substantially opposite the outer end of each partition is a pair of spaced indexing protuberances 19 and 20, 19a and 20a 19b and 20b, and 19c and 20c (Fig. 3).

The shaft 21 is extended above the vertical partitions on one side of the rim and below the rim on the opposite side. Keyed to the shaft 21 directly below the rim is a collar 18 as most clearly shown in Figure 1. The shaft is held vertically rotatably by the bearings 22 and 23 which are positioned as shown in the following paragraph.

The shaft 21 is vertically supported at the bottom by a bearing 22 attached to the bottom surface of a substantially horizontal partition 24 disposed between the members of a partial closure on the base 29, the shaft passing through an opening in the partition. The partial closure is extended around the sides and back of the three treating positions 26, 27, and 28 (Fig. 3) and over the top of said positions while a receiving and delivering position 25 remains substantially open. Leading into each of the three compartments of the carrier in the treating positions, above the partition 24, are the similar observation ports 30 and similar clean out doors 31 (Fig. 5). In addition, there may be a manhole 32 (Fig. 2) leading into a later described tank 34 and a filter drawer 33 positioned under a later mentioned opening in the partition 24 in the first treating position 26. On the top of the partial closure, the previously mentioned bearing 23 for the shaft 21 of the carrier 12 is attached in any known manner.

On the base 29 of the partial closure and under the partition 24 in the treating positions designated by numerals 26 and 27 (Fig. 3) is the tank 34 with open top (Figs. 4 and 5). Parts of the closure including the base may be used to form part of the tank as shown in Figure 4 where it will be noted that the tank extends under both the second and third treating positions 26 and 27. As illustrated, the intention is to provide two washing positions for the receptacles. However, if only one washing position is desired with the second position, for example, a rinsing position, there would be a tank under each of the first and second treating positions.

Also disposed on the base 29 is another tank 35 with open top so positioned that it will be under the third treating position 28 (Fig. 3). If the third treating position is to serve merely as a drying position, the tank 35 could be eliminated.

The substantially horizontal partition 24 is provided with an opening 33a (Fig. 3) in the first treating position which opening is protected by the previously mentioned filter drawer 33. That part of the partition over the first and second treating positions 26 and 27 and the tank 34 is slightly inclined toward the opening 33a. A similar opening 33b is also made through the partition 24 in the third treating position 28 and over the tank 35, the surface of the partition being inclined toward the opening and since a rinsing operation is involved, a screen is not imperative.

In each of the three treating positions 26, 27, and 28 are pairs of headers. Since the second treating position 27 of the illustrated device is a washing position like the first position 26, the headers 36 and 37, 36 indicating the bottom header and 37 the top header, are extended across both the first and second treating positions.

The bottom header 36 is constituted of interconnected spaced parallel tubular members (Fig. 3) disposed between the rim of the carrier 12 and the horizontal partition 24. In each of the parallel members of the bottom header are the spaced and upwardly directed nozzles 38, 39, 40 and 41 in the first treating position and the similar nozzles 42, 43, 44, and 45 in the second treating posi-

tion. It will be noted that the spaced parallel tubular members constituting the bottom header are extended through opposite sides of the closure to facilitate cleaning and are normally closed with known plugs in the usual manner.

The top header 47 is constituted of two or more, three as illustrated, inter-connected spaced parallel tubular members also inter-connected with the bottom header and positioned between the top of the partial closure and the tops of the vertical partitions of the carrier. The spaced tubular members of the top header have downwardly directed nozzles to direct streams of a washing liquid over the outer surface of the receptacles while the nozzles of the bottom header direct streams of the same liquid into the receptacles as later shown.

In the third treating position, reference numeral 28 in Figure 3, is a similar pair of headers constituted of the bottom header 46 and the top header 47.

The bottom and top headers 36 and 37 of the first and second treating positions are inter-connected through the pipe line 48 (Fig. 5) to the tank 34 containing the washing liquid which is pumped out of the tank by the electrically driven pump 49 located under the receiving and delivering position 25. A known electric timer (not shown) is inserted in the motor circuit and can be set in the usual manner for the over-all time interval that the washing liquid is to be forced into and over the receptacles as well as for the shorter time intervals giving the pulsating or intermittent flow of the liquid during the over-all time interval.

In order that the washing operation will be started only when the carrier is properly positioned, an indexing pin 50 reciprocable through the partial closure coacting with any pair of the indexing protuberances 19 and 20, 19a and 20a, 19b and 20b, and 19c and 20c on the rim 13 is provided. The pin 50 has a stationary contact arm 51 in one side of the circuit and a movable contact arm 52 in the opposite side which closes the circuit to the timer and motor when the pin is between the protuberances but when withdrawn therefrom breaks the circuit. The circuit is also provided with a warning light 71 so positioned in a hood on top of the closure that the rays will appear through an opening in the hood when the circuit is closed and so electrically connected that it will remain lighted during all of the over-all timing interval. Thus, the operator is free to leave the machine when desired, the pumping mechanism being automatically closed down by the timer at the end of the over-all time interval. The indexing pin 50 can be releasably locked by any suitable means (not shown) in the disengaged position while the carrier is being rotated to the following treating position.

The timer also controls the operation of a similar pump such as 49, or solenoid control valves which directs the rinsing liquid from the tank 35 into the headers 46 and 47 of the third treating or rinsing position in the illustrated case. The timer is operated in conjunction with the known solenoid controlled valves 53 and 54 in a known manner so that the over-all time period of the rinsing stage and the intermittent operation during that period can be preset on the timer.

In the bottom of each compartment of the carrier 12 formed by the vertical partitions 14, 15, 16, and 17 is a slideway constituted of the spaced parallel members 55 and 56, which may be rods as illustrated, disposed between the rim 13 and the opposite vertical partition, in this case 15 (Fig. 3). Extended forwardly of the spaced parallel members or rods 55 and 56 are the aligned members 57 and 58, respectively, disposed on the top surface of the horizontal partition 24 which coact to form a slideway through the open front of the carrier in the receiving and delivering position for the slidable insertion of the following described tray 59. In the interest of clarity, the slideway and tray have been shown only in the receiving and delivering position of the carrier in Figure 3.

The tray 59 is constituted of the side angle irons 60 and 61 (Figs. 1 and 3) inserted over the members or rods 55 and 56 or 57 and 58 or both as the case may be with the apex of the angle upwardly directed as shown in Figure 1. Holding the two angle irons together are the spaced cross members 62 and 63 which may be fastened to the angle irons by welding. Disposed on each cross member are other angle irons 64 and 65. To each of the angle irons 64 and 65 are vertically fastened in any

desired manner the spaced hollow holders 66, 67, 68 and 69 so positioned that as the carrier is rotated to the various treating positions and indexed by the pin 50, the hollow holders for the open necks of the receptacles or bottles in inverted position will be substantially aligned with the upwardly directed nozzles of the bottom header in each position. A stop 70 through the vertical partition 15 and coacting with the tray may be provided for aiding in the proper positioning of the tray.

Occasions may arise when the inverted receptacles in the tray at the receiving and delivering position 25 will spill some material and for the collection of which a suitable opening 71a may be made in the horizontal partition 24 for the attachment of the disposal pipe 71 which may be inter-connected to any waste line (not shown).

In the wiring diagram for the known timer shown in Figure 8, the closing of the start switch by the pin 50 energizes the over-all timer T1, the contact T1-1 closing to the timer motor M1 as well as to a motor M2 of the program or intermittent timer T2. Contacts T1-2 and T1-3 of the timer T-1 also close when the cycle is initiated and thus stand in readiness to receive impulses as imparted by contact T2-2 of the program or intermittent timer T2. Since contact T2-2 of the program or intermittent timer T2 is closed 20 seconds and open 10 seconds of every 30 seconds, the 30 seconds representing the total cycle of the program timer T2, the motor starter of the wash pump and the rinse solenoid valve are impulsed for 20 seconds of every 30 seconds. The function of contacts T1-2, T1-3, and T1-4 by the time adjustment on the timer T-1 is to limit the total interval during which the impulsing takes place. The over-all time of the cycle is the setting of the timer T1 contact T1-1, adjustable up to five minutes maximum. Thus, contact T-1 adjustment need be set for slightly more than that of T1-2 or T1-3 or T1-4. The function of contact T2-1 of the program or intermittent timer T2 is to position the timer to a point where the contact T2-2 will close two seconds or so after the start switch is closed. In this way, the work cycle is started with as little loss of time as possible. It is necessary to open the start switch, that is the pin 50, for at least one second in order to reset the timer T1 from the last run thereof to the zero reference point in readiness for the next cycle of operation. The reference numeral 71a indicates the electric warning light visible through the opening in a hood on top of the partial closure while the over-all circuit is energized; the reference numeral 71b the starter solenoid on the pump motor; reference numeral 71c the solenoid for the first segment of the over-all time in the rinse; and reference numeral 71d the solenoid for the remaining segment of the over-all time in the rinse.

The purpose of the over-all timer T-1 is to govern the over-all time of the cycle. The purpose of the program or intermittent timer T-2 is to provide a number of sequence operations. In subject application, the sequence operations are set for twenty seconds on and ten seconds off. The program or intermittent timer also brings the intermittent cycle back to the starting point of the over-all timer when it is energized, so that both timers start together rather than having the over-all timer on and nothing happening because the program or intermittent timer ended in an off position. If all of the foregoing were to be accomplished in one timer, it would become of exceptional size since each separate cycle would require separate on and off contacts built into the unit. In subject application, an intermittent timer provides the intermittent action for all the circuits.

In operation:

The tray 59, especially designed to fit the special requirements of a particular plant or laboratory is circulated about the building to collect the receptacles and even in assorted groups if desired. In the example illustrated, the receptacles are inserted in inverted position into the hollow holders 66, 67, 68, and 69 and the tray is then slid along the spaced members 55 and 56 of the slideway in the receiving and delivering position against the stop 70. The timer is then set for the over-all and intermittent periods of treatment. By pulling the indexing pin 50 out of the indexing protuberances 19 and 20 and holding it out, the carrier 12 is free to be rotated and the electrical circuit to the timer and pump is broken by the separation of the contact points 51 and 52. By revolving the carrier 12 manually clock-

wise (Fig. 3) 90° until the next indexing protuberances 19c and 20c are aligned with the indexing pin 50, the open necks of the receptacles 11 will be over the nozzles 38, 39, 40, and 41 of the first washing position. By releasing the pin 50, the circuit is closed and the pump actuating the washing liquid will force the liquid through the nozzles of the bottom header 36 into the inside of the receptacles and by the nozzles of the top header 37 over the outer surfaces of the receptacles for the duration of the over-all time interval preset on the timer and in accordance with the on and off intervals also preset on the intermittent timer. The spent liquid from both the first and second treating positions will fall back into the tank 34 through the screen 66. If the second treating position were intended for a rinsing position different construction would, of course, be required. However, in the illustrated construction at the expiration of the over-all time interval, the indicator light 71 is out showing that the time interval has elapsed. If not already loaded, the operator may then load another tray with receptacles in the empty compartment of the carrier at the loading and delivering position. By again pulling out the indexing pin 5, the carrier is again rotated 90° placing the receptacles previously washed in the first treating position in alignment with the nozzles in the second treating position, in this case also a washing position, while the newly inserted receptacles will be over the nozzles of the first treating position for the first washing operation. Then by releasing the indexing pin 50 into the corresponding indexing protuberances, in this case 19b and 20b, the motor is again set in motion to give a second washing treatment to the receptacles in the second treating position and a first washing treatment to the receptacles in the first treating position. In a similar manner, the twice washed receptacles in the second position are rotated into the third or rinsing position which brings the once washed receptacles into the second position and perhaps a new lot of dirty receptacles into the first treating position. Rather than reuse the rinsing liquid, the rinsing headers 46 and 47 could be directly connected to a fresh supply of liquid under pressure, the solenoid valves of which are opened and closed by the timer in accordance with the presetting. If extremely dirty receptacles are encountered and a longer period of time is necessary for washing than was predetermined, the operator has merely to retrip the indexing pin without rotating the carrier and the receptacles will receive the additional washing without having to pass through all the treating positions and re-enter the first treating position. The rinse treatments can be of a recirculatory nature or may originate from an outside source or may be a combination of both. The rinse treatments may be equipped with any number of solenoid valves connected to the timing circuit to provide whatever proportion of the over-all timing circuit each solenoid requires. For example, in some industries the first section of the rinses could be hot tap water or recirculated hot tap water. If the second compartment is used for rinsing then the third compartment could be used for drying with hot air or infra-red lights. The washing solution tanks and the drying section can be heated by gas if desired. The size of the washing tank makes this a practical application as a small gas burner is all that is required to heat the tank. If new glassware is to be handled and only requires a rinsing operation to remove such things as carton dust, the operator merely revolves the machine in a counterclockwise direction (Fig. 3) one-quarter of a turn instead of having the receptacles pass through the entire washing operation when only a rinse is necessary which affords a combined washer and rinser in one device.

It is apparent that the described machine is extremely simple in construction and in maintenance since there are only two bearings to grease. The machine is particularly suitable for washing with strong caustics and acids.

It will be understood that the invention is not limited to the exact disclosure herein described but may lend itself to a variety of expressions within the scope of the appended claims. For example, the number of nozzles and their spacing may be conveniently varied depending upon the number of glassware being washed.

What is claimed is:

1. A device for cleaning receptacles with open necks, the device comprising a base member, a shaft rotatably

supported in a vertical plane by said base member, a carrier for the receptacles, the carrier comprising spaced vertical partitions radially disposed on the shaft, the partitions being of equal width and height with the angles between adjacent partitions substantially equal, a rim disposed around the outer bottom edges of the partitions and forming therewith compartments, means spaced from said compartments disposed on the base member for substantially enclosing three of the compartments with one open in one position of rotation of the compartments, a substantially horizontal slideway for each compartment disposed intermediate the rim and one of the partitions forming the compartment, a tray for the receptacles slidably disposed on the slideway, the bottom of the tray being substantially open and having a plurality of upstanding hollow holders for the open necks of the inverted receptacles; the device further comprising a tank with open top disposed under at least one of the compartments in the enclosed position thereof, and means for intermittently introducing for a predetermined period a fluid from the tank into the receptacles when the compartment thereof is in a predetermined position over the tank.

2. A device for cleaning receptacles with open necks, the device comprising a square base member, an upstanding closure disposed on the base member, the closure at the front having formed therein a vertical opening adjacent one end and extending from the top to the bottom of the closure, the opening further having a width substantially equal to one-half the width of the closure at the front, a horizontal partition disposed in the closure intermediate the top and bottom thereof, a vertical shaft rotatably disposed intermediate the center of the horizontal partition and the top of the closure, vertical partitions disposed on the shaft and dividing the closure into substantially equal compartments, a rim disposed around the outer ends of the partitions at the bottom, a tank with open top disposed on the base member adjacent the back of the closure, a second tank with open top disposed on the base member at one side of the opening in the closure, the horizontal partition having formed therein an opening leading to the first-mentioned tank and a second opening leading to the second-mentioned tank, means for removably inserting the receptacles in an inverted position in one of the equal compartments, an electric pump for directing a liquid from the first-mentioned tank in opposite vertical directions toward the receptacles, a second electric pump for directing a liquid from the second-mentioned tank in opposite vertical directions toward the receptacles, a circuit for each pump, means through the closure coacting with the rim for indexing the compartments over the tanks, the indexing means in one position closing the circuits and in a second position opening the circuits to the pumps, a timer controlling the overall period of operation of the two circuits, and a program timer for the two circuits coacting with the first-mentioned timer to provide intermittent pump action during the overall period.

3. In a device for cleaning receptacles when rotated over a plurality of cleaning positions; the improvements comprising a fluid for cleaning the receptacles in each cleaning position, an electric pump for directing the fluid against the receptacles in each position, indexing means for positioning the receptacles over each cleaning position, a circuit for the indexing means and the pump, the indexing means closing the circuit when the receptacles are positioned over one cleaning position and opening the circuit when the receptacles are rotated to another cleaning position, an over-all timer controlling the operations of the device disposed in the circuit, an intermittent timer disposed in one side of the circuit of the over-all timer to provide a pulsing operation at each cleaning position.

4. In a device for cleaning receptacles when rotated over a plurality of cleaning positions; the improvements comprising a fluid for cleaning the receptacles in each cleaning position, an electric pump for directing the fluid against the receptacles in each position, indexing means for positioning the receptacles over each cleaning position, a circuit for the indexing means and the pump, the indexing means closing the circuit when the receptacles are positioned over one cleaning position and opening the circuit when the receptacles are rotated to

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another cleaning position, an over-all timer controlling the operations of the device disposed in the circuit, an intermittent timer providing a pulsing operation at each cleaning position disposed in one side of the circuit of the over-all timer, the intermittent timer having on and off positions arranged to bring the start of the on position coincident with the start of the over-all timer.

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