United States Patent

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[45] Patented **Oct. 20, 1970**
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[33] **Germany**
[31] **P 1,457,005**

[54] **CLEANING MACHINES FOR CONTAINERS**
7 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **134/152,** 134/153, 134/155, 134/171, 134/177
[51] **Int. Cl.** **B08b 3/02,** B08b 9/08, B67c 1/06
[50] **Field of Search** ..... 134/80, 81, 85, 86, 96, 103, 152, 153, 200, 177, 155 (considered); 171 (considered); 15/63

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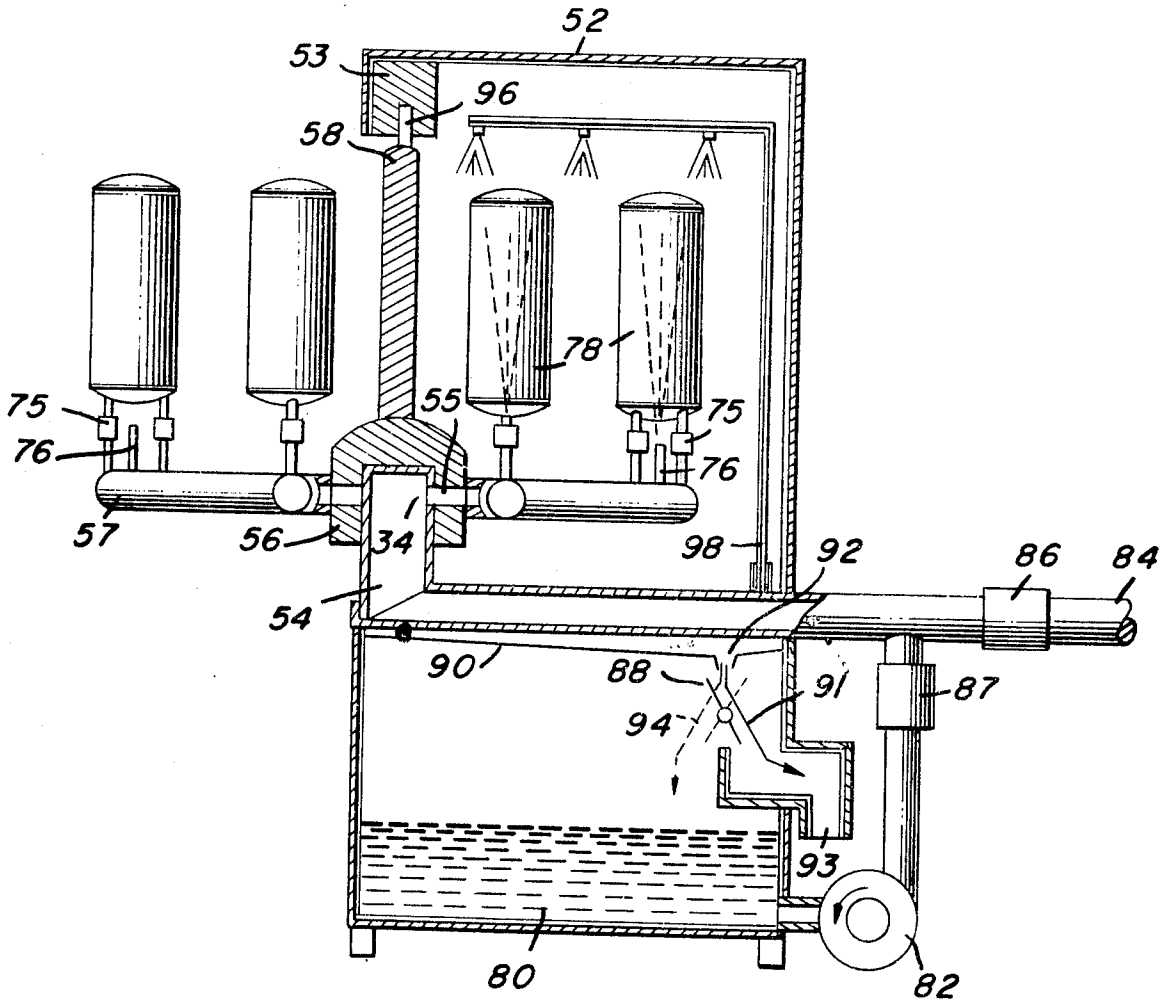
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ABSTRACT: A container washing machine has two semicircular pipes fixed together at opposite ends and supported by radial pipes which are rotatably mounted on an axial supply pipe which has a radial opening for communicating with a radial pipe for supplying cleaning or rinsing fluid to nozzlelike container mountings of a semicircular pipe which is within a cleaning chamber while shutting off fluid to the other radial pipe and to nozzles of the semicircular pipe which is outside of the chamber.



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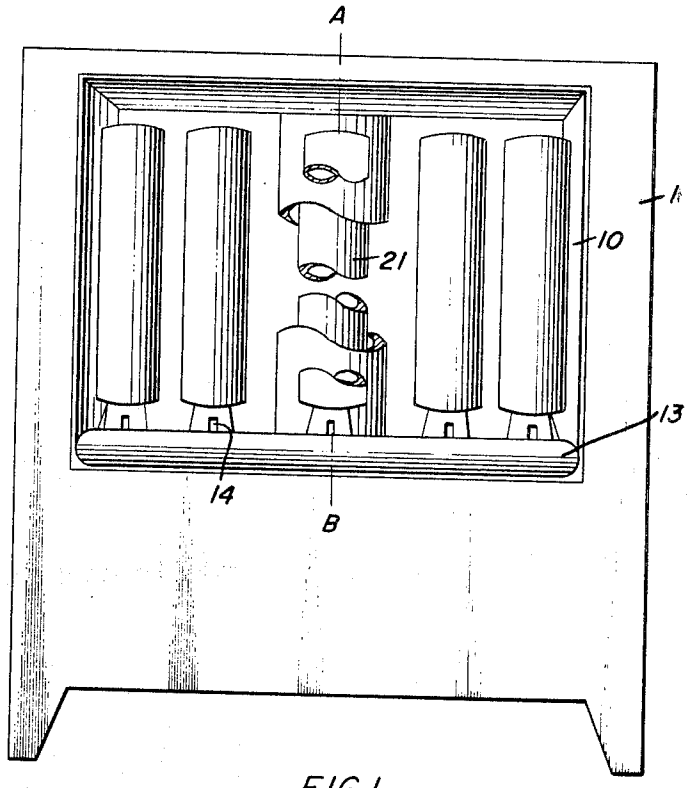


FIG. 1

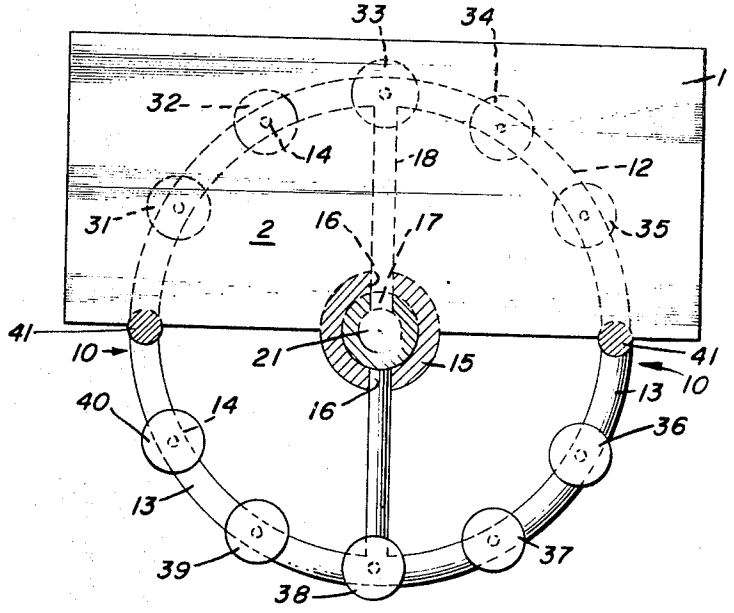


FIG. 2

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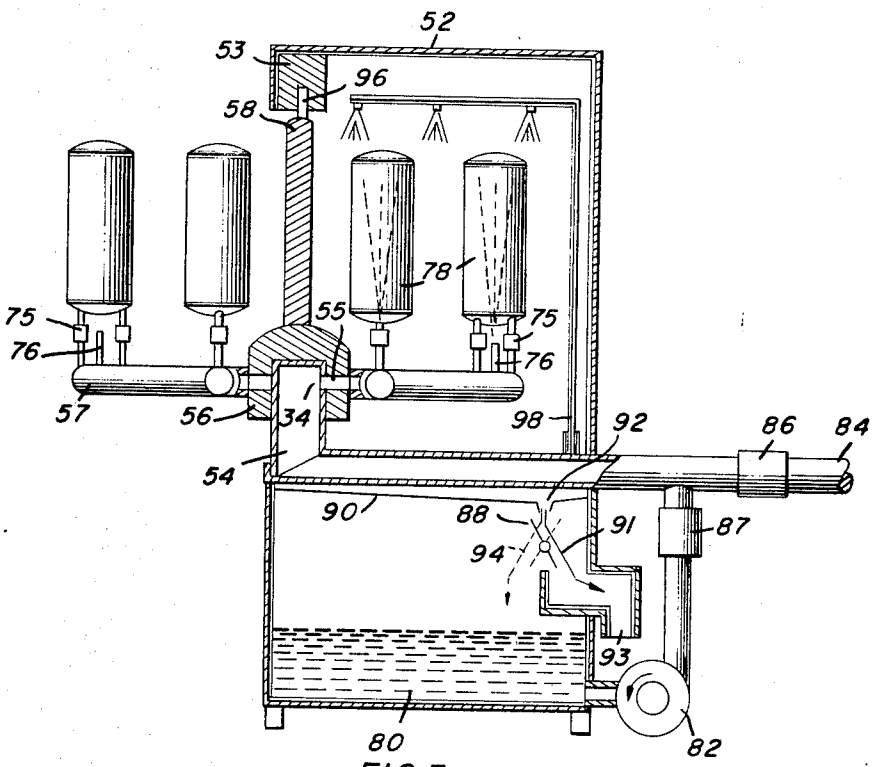


FIG. 3

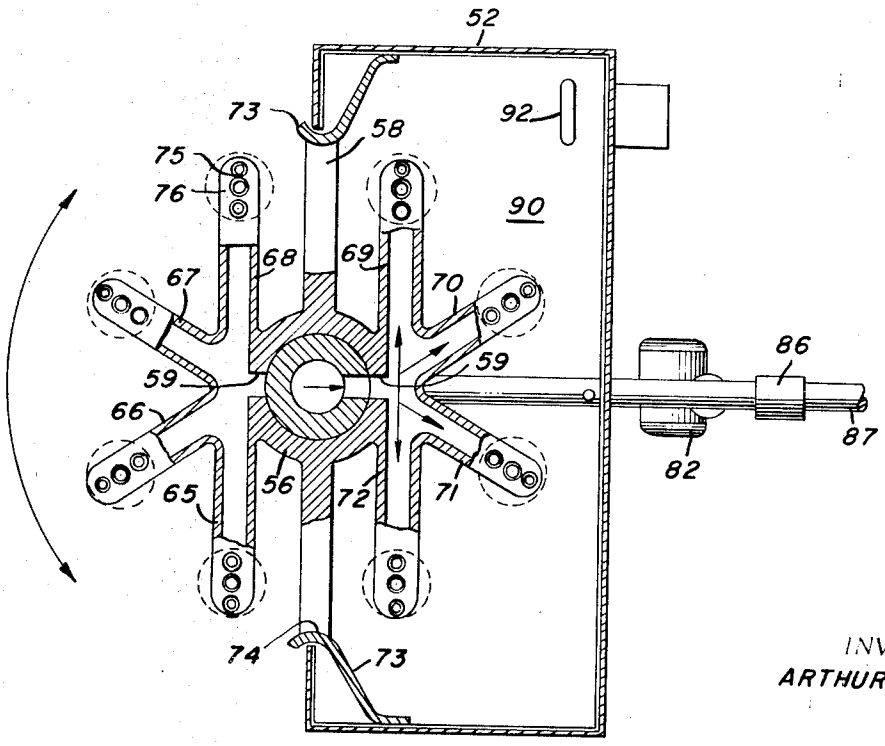


FIG. 4

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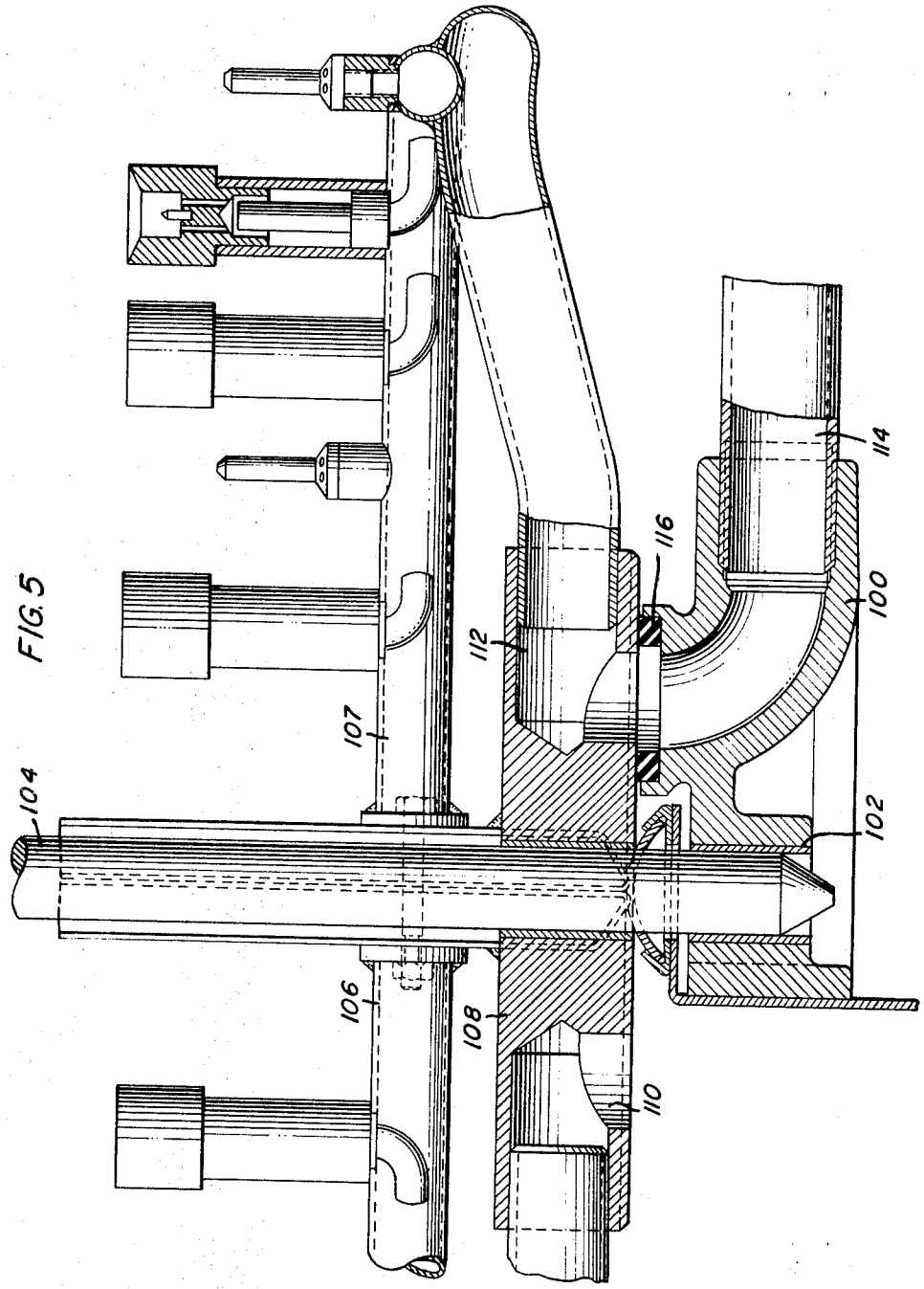


FIG. 5

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CLEANING MACHINES FOR CONTAINERS

BACKGROUND OF THE INVENTION

This is a continuation-in-part of Application Ser. No. 593,105, filed Nov. 9, 1966 by Arthur Till for Cleaning Machines for Containers or Cans Especially for Premix Containers, now U.S. Pat. No. 3,447,543, issued June 3, 1969, which is based upon German Application No. T 29 802 III/6f, filed Nov. 17, 1965, the priority of which is hereby claimed.

Cleaning machines for that purpose are known. Machines for cleaning small numbers of pieces per hour mostly consist of a stationary sheet steel case, with a door or an opening, appliances for the containers and nozzles properly arranged for cleaning outside and inside.

The disadvantage of these machines is, that they cannot be used very economically, for the time is lost, which is needed to exchange the containers after finishing a cleaning.

Machines for cleaning higher numbers of pieces per hour are made rotating like the principle of known rotary bottle cleaners.

The disadvantage of those machines is, that they are expensive to manufacture and cumbersome in construction by the necessity of driving gears to provide for rotation. Besides, the mechanical driving gears are liable to breakdowns.

To exclude those disadvantages a cleaning machine is recommended according to the invention, by which on the one hand the operating time will be utilized completely for cleaning, while on the other hand, no rotation process by motor power is necessary.

The invention is concerned with a cleaning machine for containers, especially for the beverage industry.

The invention has the advantage, that only one pump system and one electric automatic modulating or control system is required as in more simple known apparatus, and that in spite of this the cleaning capacity is doubled.

There are different methods, the illustrated preferred embodiment is only an example. The machine may have various forms, such as rectangular and round. The chambers may have a different capacity. An embodiment of the invention is described in more detail in the attached drawing.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a cleaning machine of simple construction in which a number of containers can be cleaned, while a number of previously cleaned containers are being removed and are being replaced by a similar number of dirty containers to be cleaned, thus making maximum use of the cleaning action of the machine. The movement of dirty containers into and cleaned containers out of the cleaning section of the machine is effected simultaneously by simple rotation of a turnable frame. The rotation also effects a changeover in the feed of cleaning materials from one set of nozzles associated with the cleaned containers to another set of nozzles associated with the dirty containers.

The cleaning machine of the present invention comprises in combination a housing, a frame turnable around a vertical axis at the front of said housing. The frame includes two hollow semicircular pipes and a number of upwardly directed jet-producing nozzles on the pipes. Openings of the nozzles communicate with interiors of the pipes. A stationary feed pipe for feeding water or cleaning compounds to the housing is disposed centrally in said frame. The feed pipe is provided with an axial opening cooperating alternately with a pair of openings in a coaxial, turnable outer pipe.

The semicircular pipes are coupled with the turnable outer pipe for movement therewith, feed pipes extend between the openings in said turnable outer pipe and said semicircular pipes, whereby in one position of the turnable frame one group of nozzles is in communication with the stationary feed pipe, whereas in another position of said frame the other group of nozzles is in communication with the stationary feed pipe.

Although the objectives of the invention may be accomplished in several ways, a single preferred embodiment of the invention described, by way of example, with reference to the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a front elevation of a cleaning machine, with some parts broken away for clarity.

FIG. 2 is a diagrammatic, partially sectional plan view of the machine shown in FIG. 1.

FIG. 3 is a lateral section of a different embodiment.

FIG. 4 is a vertical section of that embodiment.

FIG. 5 is a detail of a preferred embodiment.

DETAILED DESCRIPTION OF THE DRAWINGS

A preferred embodiment is described in FIGS. 1 and 2. In FIG. 1, 1 shows the case in front view; 10 is a frame, which is turnable around the axis A–B. At the frame 10 two semicircles of pipe 12 and 13 are attached—as shown in FIG. 2. On pipes 12 and 13 the containers 31—40 are mounted to be cleaned. The cleaning compound gets through the hollow pipe 21 either into the semicircular pipe 12 or into the semicircular pipe 13, always into only that one of the semicircular pipes which is inside the machine 1.

In FIG. 2 is shown the semicircle 12, on which the containers 31—35 are mounted, and which containers will be cleaned. After finishing the cleaning procedure, the frame 10 will be turned, until the semicircle 13 is inside the machine case, and then the containers 36—40 will be cleaned. During a cleaning procedure it is possible to change outside the machine case the cleaned containers for those ones to be cleaned.

As shown on the drawing, the machine comprises a housing 1 having a cleaning chamber in an upper portion thereof. The circular frame 10 is mounted for rotation about axis A–B at the front of the housing and includes upright members 41 which separate opposed ends of two semicircular hollow pipes 2 and 3, which are alternately placed within the cleaning chamber 2 by rotation of the frame 10. Each of the pipes 2 and 3 carries a number of upwardly directed jet-producing nozzles 14 in communication with the interior of the pipes. A stationary axial feed pipe 21 is mounted at the front of the housing on the axis A–B and is adapted to be fed with water or cleaning fluids from an appropriate source by conventional feed apparatus, not shown.

The frame 10 includes auxiliary pipes for feeding materials introduced through axial supply pipe 21 to nozzles 14 which are located in the cleaning chamber. A rotatable vertical axial pipe 15 surrounding supply pipe 21 and has a pair of opposed openings 16 which are adapted to be alternately aligned with an outlet opening 17 in supply pipe 21. A pair of auxiliary feed pipes 18 extend from the openings 16 to the openings 19 in the semicircular pipes 12 and 13. As shown, containers 31 through 40 may be positioned over the nozzles 14.

When containers 31 through 35, which are mounted on the semicircular pipe 12, are being cleaned, the nozzles on the pipe 13 are not being fed with cleaning materials, and the containers 36 through 40 may be removed and replaced by dirty containers to be cleaned. The exchanging dirty and cleaned containers and the switching of cleaning material feed from one set of nozzles to the other are simultaneously effected by simple rotation of frame 10. All the nozzles in use in cleaning chamber 2 are fed simultaneously from a common supply 21; soaking, washing and rinsing cycles for predetermined periods may be controlled by well-known apparatus. The periods of feed may be altered readily by conventional means, whereas if some nozzles were being fed with water at the same time as other nozzles were being fed with cleaning compound, as is done in some step-by-step prior art machines, alteration of the cycles would be more difficult.

The cleaning machine according to the present invention has several advantages. There is always one group of noz-

zlelike container holders not in action. Cleaned containers can be removed from those jets, and other soiled containers can be put on those jets. At the same time, the group of jets inside the case is in action, and water or special cleaning fluids are passing through the jets and washing the dirty containers. As soon as the cleaning process is finished, the turnable frame is turned 180°, and the operator can remove the cleaned containers and add the next series of dirty containers. As soon as he has filled the frame with dirty containers, the operator may again turn the frame 180°. No time is wasted and the operator can be kept busy all of the time.

FIGS. 3 and 4 schematically show a preferred embodiment of the container cleaning machine. A housing or case is generally represented by the numeral 52. At open front 53 of housing 52 a vertical supply pipe 54 is mounted. The supply pipe has axial opening 55 pointing rearwardly. A hub 56 of a wheel generally indicated by the numeral 57 is supported on the vertical supply pipe for rotation thereabout. A flat door 58 is fixed to hub 56 for rotation therewith about the vertical supply pipe to close the open front 53 of housing 52 in each of two opposed rotational positions of hub 56. First and second sets of radial and tangential supply arms 65, 66, 67 and 68, and 69, 70, 71 and 72 project outwardly from hub 56 on opposite sides of door 58. One set of the arms is inside of the housing while the other set of the arms is outside of the housing. The entire hub door and arm assembly is held in one of its two 180° opposite positions by spring 73 which is mounted on housing 52 cooperating with groove 74 in a lateral edge of door 58. Radial apertures 59 in hub 56 are selectively aligned with radial opening 55 in vertical supply pipe 54 to selectively provide fluid to the first or second set of arms, whichever set is within the housing 52. Bottle mountings 75 and upward pointing nozzles 76 are mounted at the end of each arm. Beneath housing 52 there is a cleaning fluid reservior 80 which is pumped through the supply pipe and the appropriate nozzles by pump 82. A makeup line 84 which is controlled by valve 86 supplies rinsing water to the supply pipe 54. When valve 86 is open to admit rinsing water and when valve 87 is closed to prevent the supplying of cleaning fluid, deflector 88 is placed in the position shown in the drawing so that the rinsing water collected in drain 90 is dumped out of the drain pipe as shown by arrow 91 which represents the flow of used rinse water. When valve 86 is closed and valve 87 is open to supply cleaning fluid from sump 80 through pump 82 to supply pipe 54, deflector 88 is rotated clockwise to the position shown in phantom view so that the cleaning fluid is deflected from drain 90 along the path shown by arrow 94 into sump 80.

In order to promote the pivoting of hub 56 and door 58 about the supply pipe 54, the door is provided with a pivot 96 as shown in FIG. 3. Washing and rinsing of the outside of the containers is facilitated by spray pipe 98.

With the start of the cleaning cycle induced by electrical impulse, valve 87 is closed, valve 86 is opened, and prerinse water flows through the piping 84, through the spray pipe 98 and through axial supply pipe through opening 34 and aperture and through arms 69, 70, 71 and 72 to the nozzles 76 within chamber 52, rinsing containers 78 within chamber 52. Water flowing from nozzles 76 runs across the drain floor 90 through hole 92 and onto deflector 88 which is positioned so that water flows in the direction of the arrow 91 from the housing into the drain 93.

After the finish of the prerinsing, through electrical controls pump 82 is switched on and cleaning solution is carried to nozzles 76 of arms 69, 70, 71 and 72, which are within cleaning chamber 52. Simultaneously, valve 87 which may be a check valve is opened and valve 86 is closed. Simultaneously, diverter 88 moves clockwise into position to deflect fluid back into sump 80. The cleaning fluid coming from the nozzles flows over the drain floor 90 into drain hole 92 over the diverter 88 in the direction of arrow 94 back to the solution tank. After washing is completed the final rinse with water begins, in the same way as the prerinse, and the containers in chamber 52 are rinsed.

Simultaneously, with the process described, clean containers are removed and dirty containers are placed on mountings 75 of arms 65, 66, 67 and 68. Hub 56 is turned 180°, placing the containers on arms 69, 70, 71 and 72 outside of the housing 52, where they can be replaced with new ones. Simultaneously, the cleaning cycle begins for the containers placed inside housing 52 through the 180° turn.

Through the method described above, at the time a cleaning cycle is in progress within the housing, outside of housing 52 clean containers on the wheel are removed and replaced by dirty ones. The time for removal and replacement of containers may be kept shorter than the length of the cleaning cycle. The result is a continuing cleaning process. With the present 180° turn method, it is possible to carry the prerinse water, the cleaning solution, and final rinse water successively to half the nozzles at one time. Therefore, one can, through suitable electrical controls, extend the rinse time for the cleaning solution without extending the prerinsing and final rinsing in the process. This means, in practical use, a considerable advantage in the output per hour performance of the container cleaning machine.

A detail of a preferred embodiment of the invention is shown in FIG. 5. In this embodiment a stationary casting is indicated by the numeral 100. Bearing 102 in the stationary casting supports a rotatable axle 104. Connected to axle 104 for rotation therewith are semicircular tubes 106, 107 which are similar to elements 12 and 13 in FIG. 2. Water directing base 108 is also connected to rotate with axle 104. Water directing base 108 has two opposed cavities 110 and 112 which are connected with the hollow semicircular tubes. Cavity 112 is connected with tube 107, while cavity 110 is connected with tube 106. The cavities open downwardly or axially with respect to axle 104 so that the cavities may be axially aligned with the upward opening in supply pipe 114 which is part of the base casting 100. Washer 116 cooperates with distribution element 108 by wiping along the bottom of the distribution element so that no leakage occurs between the supply pipe and the distribution element and its cavities 110 and 112. Cleaning fluid or rinsing water is supplied to supply pipe 114 in a manner discussed in the previous description particularly with reference to FIGS. 3 and 4. Water moves axially between the supply pipe and the cavity and radially out of the cavity into the semicircular cleaning pipe or into a branched cleaning pipe such as shown in FIG. 4. Water flows from the control valves into supply pipe 114 and into the chamber 110 or 112 of the hub 108 and then into the appropriate cleaning tube.

Although this invention has been described with reference to specific embodiments, it is obvious that several modifications and variations may be made without departing from the scope of the invention. For example, more than one supply pipe might be used, with successive movements of the frame connecting a section first to one supply and then to another. The frame may be angular, even square. Many other modifications might be made. The scope of this invention is not limited to the particular embodiment which has been described in detail; precise limits of the invention are defined only in the following claims.

I claim:

1. A container washing machine comprising a chamber having an open face, a base, a supply pipe connected to the base and projecting into the chamber and having an opening directed toward the chamber, a hub having first and second opposite channels rotatably mounted on the base adjacent the supply pipe, whereby the first and second channels are selectively aligned with the opening in the supply pipe, first and second cleaning pipe means connected to the hub, the first pipe means being communicant with the first channel and the second pipe means being communicant with the second channel, container holders associated with the pipe means, nozzle means on the pipe means directing fluid from the pipe means toward containers mounted on the holders, door means mounted on the hub and spanning an opening in the open

face, detent means on the chamber and door means cooperating to hold the door means and the hub in one of two 180° opposed positions, whereby the first and second pipe means may be selectively rotated into the chamber on the hub means about the base, and whereby containers mounted on holders within the chamber are supplied with fluid through the supply pipe, the opening in the pipe, the related channel in the hub and the pipe means, and nozzle means within the chamber, and whereby fluid is cut off from the channel, pipe means and nozzle means outside of the chamber, whereby clean articles can be removed from holders and dirty articles placed on the holders outside of the chamber.

2. The container washing machine of claim 1 further comprising sump means below the chamber and pump means communicant with the sump means and with the supply pipe for propelling cleaning fluid from the sump means to the supply pipe, and pipe means for supplying rinsing fluid to the supply pipe.

3. The cleaning machine of claim 2 further comprising drain means and movable deflection means mounted in the sump means for deflecting rinsing fluid into the drain means and for deflecting cleaning fluid into the sump means.

4. The container washing machine of claim 1 wherein the first and second pipe means comprises antlerlike arms.

5. The container washing machine of claim 1 wherein the first and second pipe means comprise first and second pipes respectively supported by first and second radial pipes connected to the hub.

6. The machine of claim 5 wherein the first and second pipes are semicircular.

7. The machine of claim 6 wherein the semicircular pipes abut at opposite longitudinal ends thereof.