

April 26, 1938.

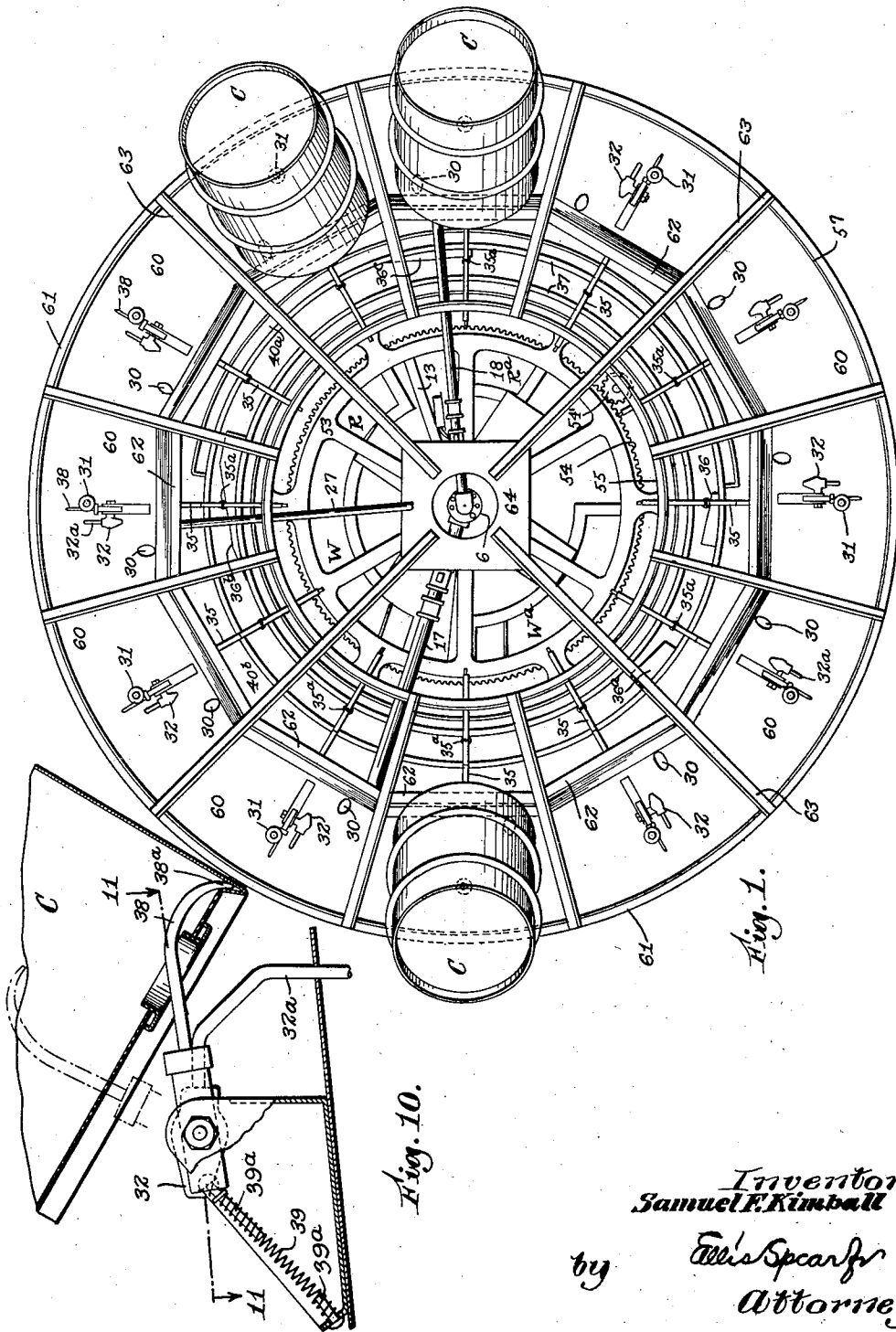
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2,115,202

APPARATUS FOR RECONDITIONING THE INTERIOR OF CONTAINERS

Filed Sept. 14, 1933

7 Sheets-Sheet 1



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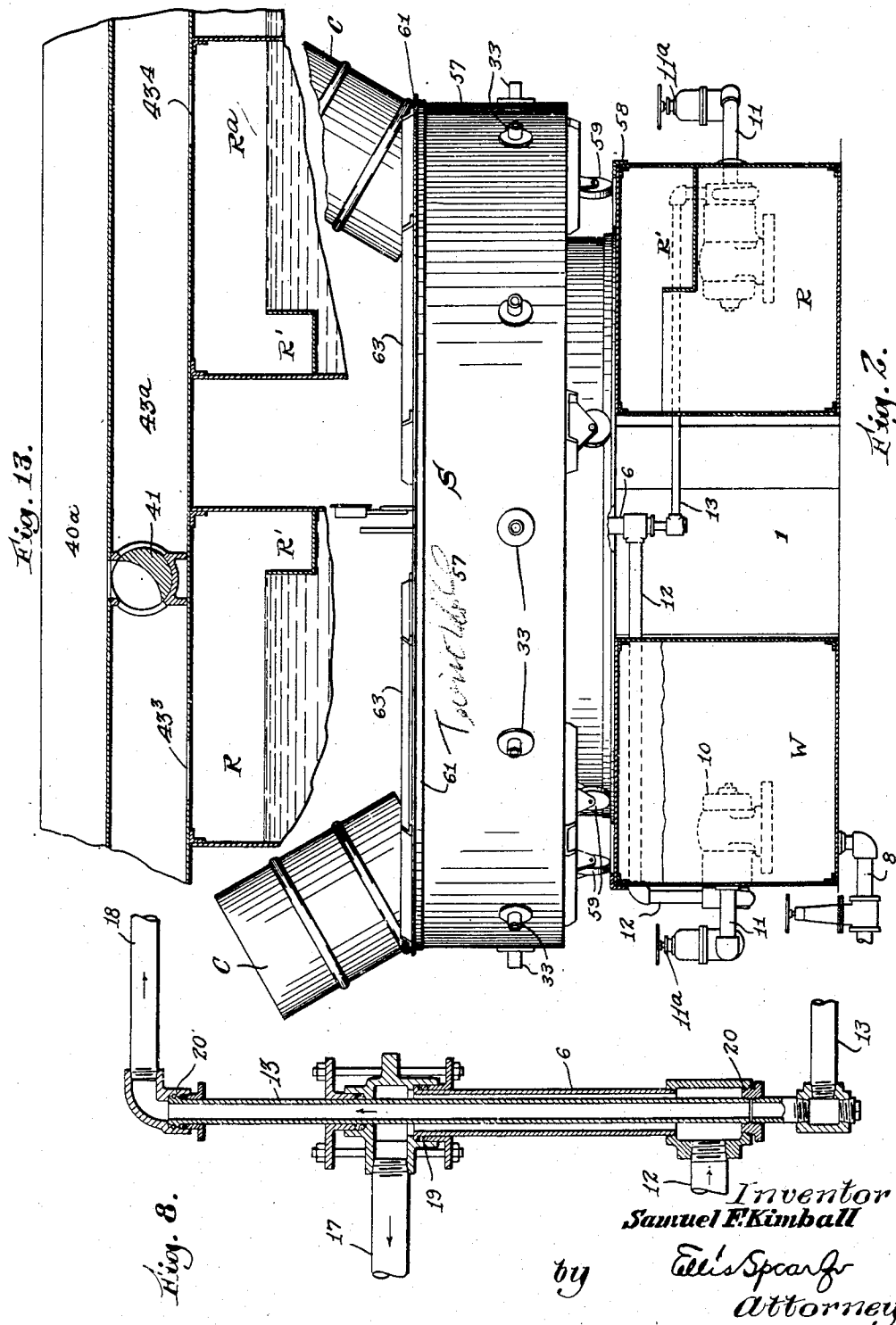
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APPARATUS FOR RECONDITIONING THE INTERIOR OF CONTAINERS

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7 Sheets-Sheet 2



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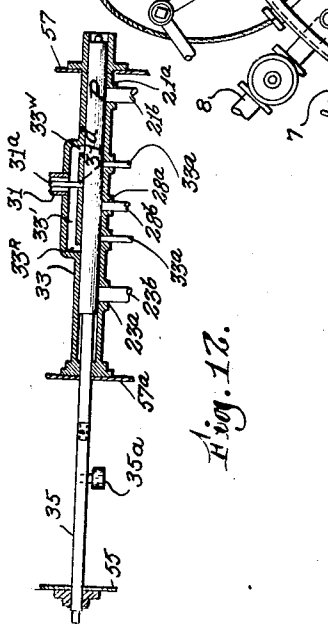
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7 Sheets-Sheet 3



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7 Sheets-Sheet 4

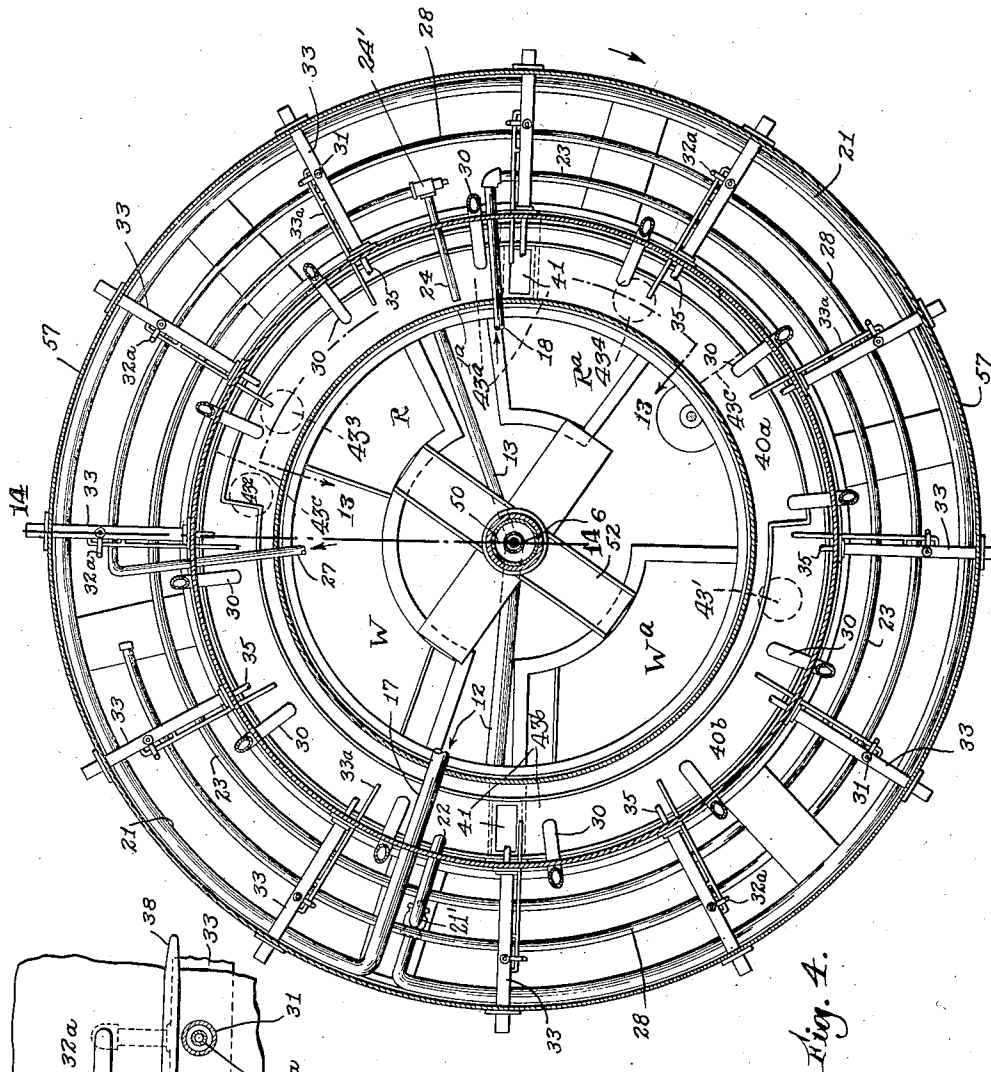


Fig. 4.

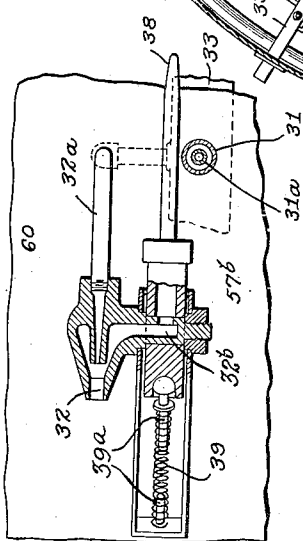


Fig. 11.

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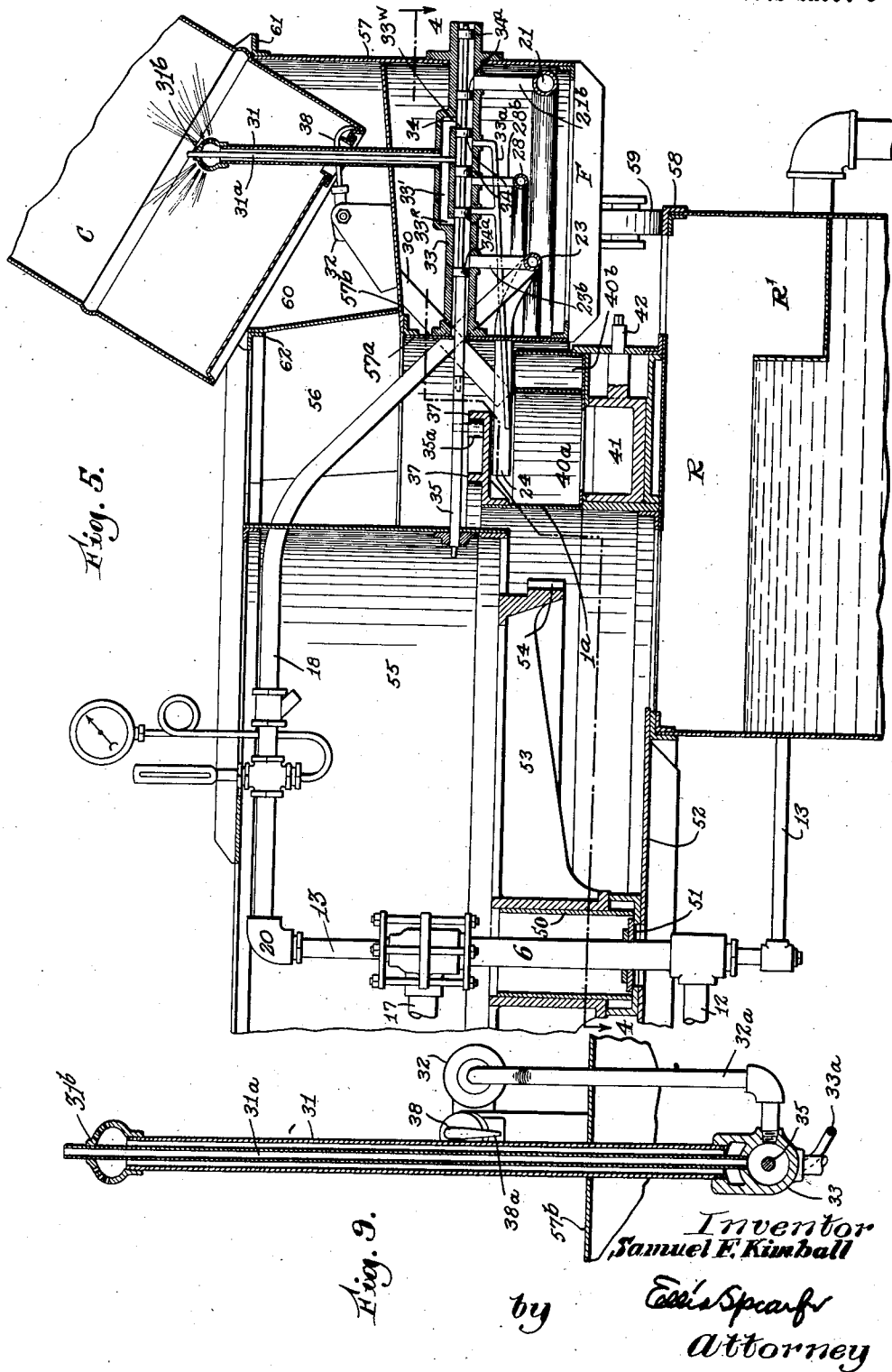
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APPARATUS FOR RECONDITIONING THE INTERIOR OF CONTAINERS

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7 Sheets-Sheet 5



April 26, 1938.

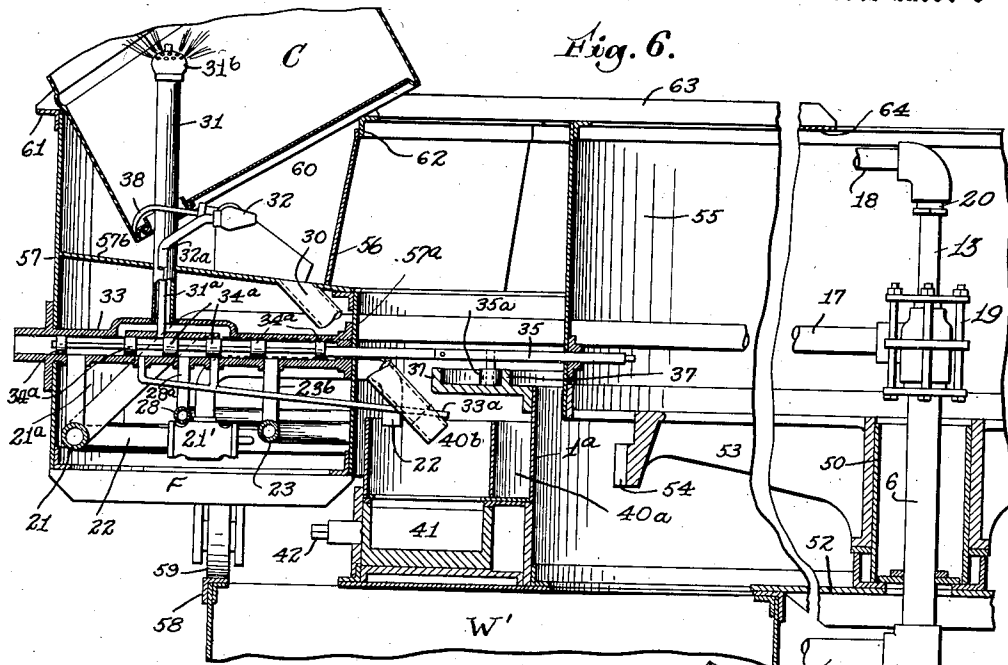
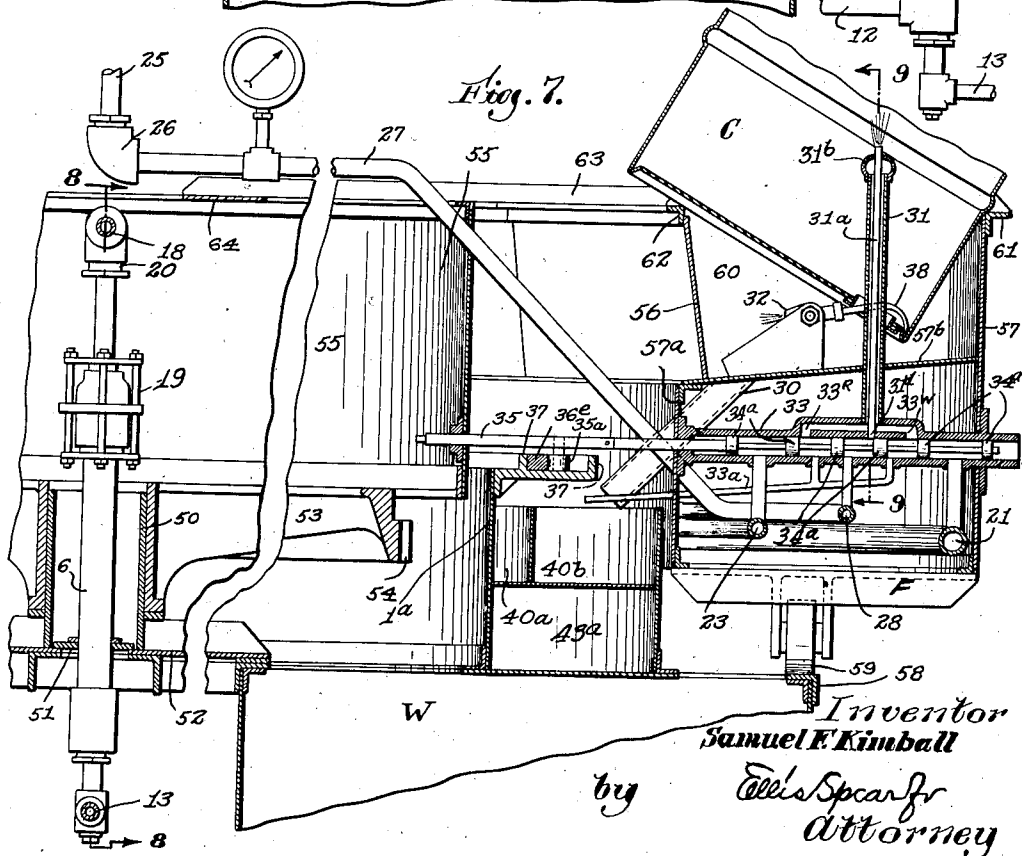
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APPARATUS FOR RECONDITIONING THE INTERIOR OF CONTAINERS

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7 Sheets-Sheet 6



April 26, 1938.

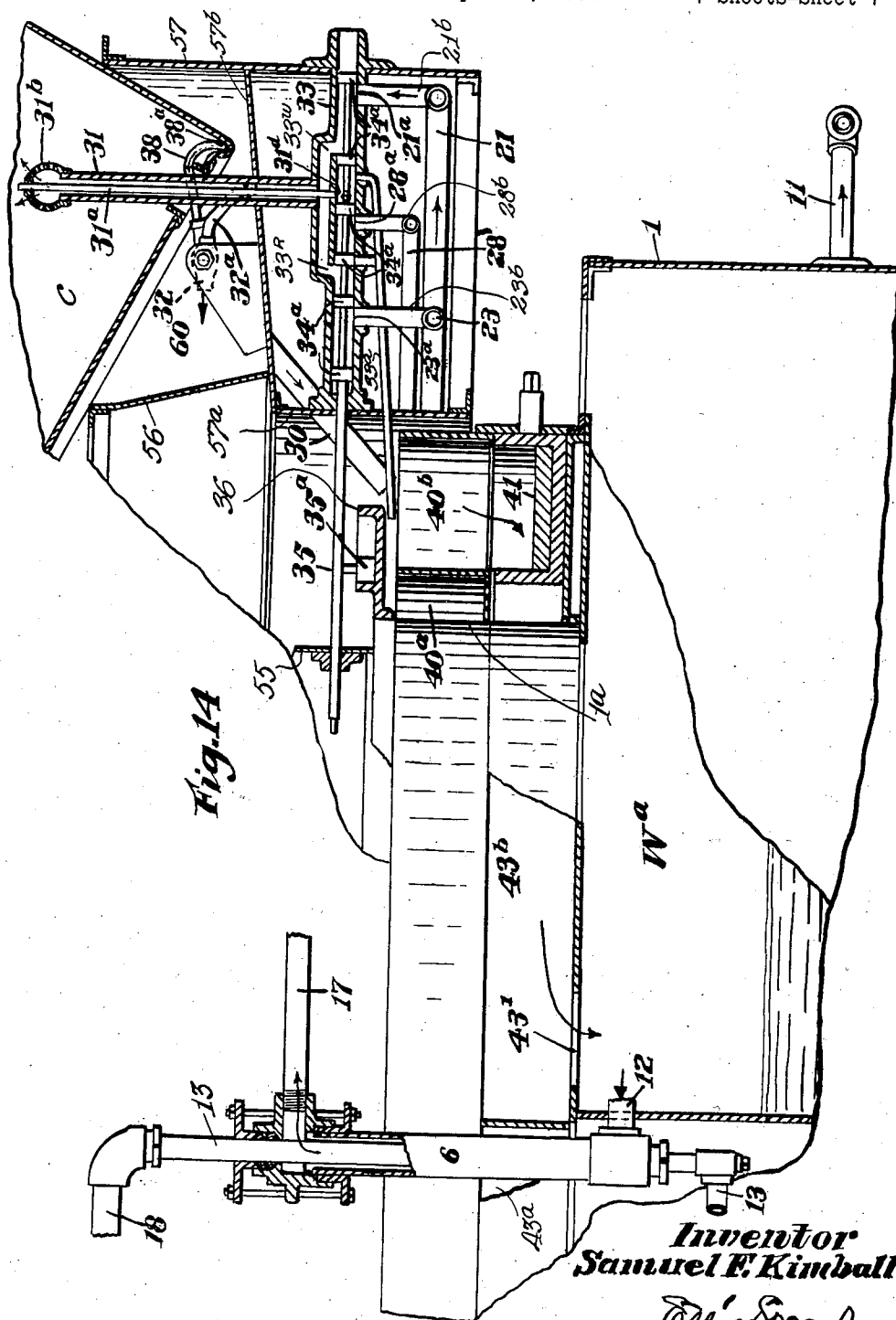
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APPARATUS FOR RECONDITIONING THE INTERIOR OF CONTAINERS

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7 Sheets-Sheet 7



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UNITED STATES PATENT OFFICE

2,115,202

APPARATUS FOR RECONDITIONING THE INTERIOR OF CONTAINERS

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Application September 14, 1933, Serial No. 689,425

12 Claims. (Cl. 141-6)

My present invention contemplates a novel type of machine adapted to wash, rinse and dry the interiors of containers, particularly of barrel or cask type, so that such containers may be thoroughly reconditioned.

Many containers now in use in commerce are so costly that re-use is an economic necessity. The varied substances carried therein present varied problems as to the cleansing of the interiors. Some efforts have been made to accomplish this task by machine, but as yet this work is in practice almost entirely done by manual labor.

The container must be thoroughly washed, cleansed and dried, or else the re-use of the container will prove false economy by reason of solutions or suspensions of the substance carried, and by the presence of dirt, impurities, or other substances remaining in the container. At the same time, it is essential to keep the cost of reconditioning down and this demands that the barrels be reconditioned rapidly. The cost of the fluids and of heating the fluids even where the water rates are a negligible factor have also been real obstacles. Other problems involved and their solutions will appear from the ensuing description.

My concept solves these problems on the basis of a rotatable container carrier, fed from and discharging into fluid tanks, and capable of washing, rinsing and thoroughly drying containers entirely automatically without any handling of the container by the operator from the time it is positioned on the carrier until it is removed therefrom. This I am able to accomplish according to my invention as herein discussed by the injection of washing and drying fluids into the barrel at suitable temperatures under pressure, and draining and drying the interior by the use of a siphon and compressed air after each injection.

One factor of importance, as indicated, is the supply of fluids. Since a large number of units must be cleansed, a large amount of water must be used. This water is heated to a suitable temperature, and while it will inevitably have to be replaced, economy and efficiency demand that the fluid be kept in circuit as long as possible and until unfit for further use. The washing and rinsing water should be kept independent of each other and not allowed to mix so that the condition of each fluid can be determined and the water or solution replaced or re-heated only when necessary. The fluid circuits are so important that an efficient small capacity machine may be constructed employing this feature but

requiring manual movement of the containers from station to station.

Another major problem has been that of thoroughly drying the containers. Inasmuch as most, if not all, containers of barrel type, have annular grooves, chimes or lips, the barrels will not completely drain through the bung. Since barrel reconditioning requires thorough drying, to overcome this difficulty I utilize a siphon to remove effectively all water collected in the grooves.

So that under the most adverse conditions the reconditioning of the barrels may be uninterrupted, I propose, among other factors, to use duplicate tanks for both the washing and the rinsing fluids so that one may be flushed out, refilled and heated to the proper temperature while the other is being used in actual reconditioning operation.

In the drawings I have shown an illustrative embodiment of my invention, and throughout the drawings and specifications, like reference characters are used to indicate corresponding parts. In the drawings:

Fig. 1 is a plan view of a machine in accordance with my invention.

Fig. 2 is a side elevation partly sectioned of the same.

Fig. 3 is a plan view of the base of such machine exposing the fluid supply and control system with rotatable conveyor and upper parts removed.

Fig. 4 is a transverse sectional view on the line 4-4, of Fig. 5.

Fig. 5 is a partly sectioned view through the rinsing station.

Fig. 6 is a similar view of the washing station.

Fig. 7 is a similar view through the air drying and drain station.

Fig. 8 is an enlarged partial vertical section through the central concentric supply and rinse pipes as indicated at 8-8, of Fig. 7.

Fig. 9 is an enlarged cross section on the line 9-9 of Fig. 7, through the inside supply pipe to the control.

Fig. 10 is an enlarged detail showing the siphon and drain for the containers.

Fig. 11 is a plan cross section on the line 11-11, of Fig. 10.

Fig. 12 is a sectional detail of a piston control valve.

Fig. 13 is a fragmentary section on the indicated line 13-13, of Fig. 4, showing the control valve for the rinse tanks, and

Fig. 14 is a section substantially on the line 14-14, of Fig. 4, showing the control valve for the wash tanks.

14—14 of Fig. 4 and showing the complete circulation of the washing fluid.

My apparatus, as illustrated herein, consists of a circular base generally indicated by the reference numeral 1 and a rotatable container carrier generally indicated at S in Fig. 2. In the base 1 are positioned the fluid tanks, the pumps, the drainage collecting and return conduits and the cam track. The container carrier contains a plurality of container receivers each including a nozzle and fluid exhausting means, fluid and air delivery conduits to each receiver, and a valve for each receiver in control of those conduits adapted to be actuated by said cams, all of which and the operation thereof will hereinafter be fully described.

In the base 1 is a tank W for washing water and a tank R for rising water. As it is desirable to keep my apparatus in operation uninterrupted by the filling, draining, or cleaning of the tanks, or by the heating of the fluids, I provide duplicate tanks W^a and R^a in the base 1, which may be used alternately with the tanks W and R respectively. The washing fluid tanks W and W^a and the rinsing fluid tanks R and R^a are provided with scum traps W¹ and R¹ respectively (see Fig. 3).

Each tank is provided with a valve controlled inlet pipe 7 influenced by a float 7^a and to which inlet pipe 7 may be attached any such means as a hose for flushing out the interior of the tanks, as is shown at 7^b in Fig. 3 in connection with the tank W^a. Valve controlled drains 8 permit each tank to be drained. Each tank is provided with heating means shown at 9 in the tank W (Fig. 3) and only indicated in the other tanks to simplify the drawings. The heating means 9 are controlled as by thermostats indicated at 9¹.

Pumps 10 are provided for each fluid. Each pump 10 is connected by intake pipes 11 to both tanks for each fluid. The pipes 11 are controlled by valves 11^a so that any tank may be connected to the pump 10 for that fluid while the other tank for that fluid is either held in readiness or being prepared for use.

From the pump 10 for the washing fluid, a main 12 leads into a riser head 6 extending into the container carrier S, and from the pump 10 for the rinsing fluid a main 13 passes axially through the head 6 (see Figs. 2, 5, 6, 7 and 8).

The arcuate inner edge of each tank supports the outer end of one of the two crossed arms 52 which are centrally apertured to permit the passage therethrough of the riser 6 supported thereon by the members 51. This may also be seen in Fig. 4.

Adjacent the riser head 6 and the inner ends of the arms 52 a rotatable hub and bearing are indicated generally by the reference numeral 50. The hub 50 has spoke-like arms 53 carrying the gear 54 in mesh with a pinion 54¹ (Fig. 1), operatively connected through suitable shafts and gearing (not shown) to the driving motor M.

The arms 53 support an inner wall 55. The outer wall 57 and the middle wall 56 are secured together by radial wall members 63, some of which extend like spokes to a common anchor plate 64 at the center (see Fig. 1).

A wall 57^a is spaced inwardly from and connected to the outer wall 57 by a frame indicated at F, Fig. 7, which frame is provided with supporting wheels 59 adapted to travel as the container carrier S rotates over the circular track 58 on the base 1.

The walls 57^a and the outer wall 57 support an inwardly sloping floor 57^b on which the wall 56 is mounted, and defining with the members 63, the container receivers, generally indicated at 60, and in which receivers 60 containers C are adapted to be supported in canted position when their bung holes have been placed over the nozzles 31 later to be described. The sides of containers C bear against the rail 61 on the outer wall 57 while the bottoms bear on the rail 62. (See Figs. 1, 5, 6 and 7).

From the floor 57^b of each receiver extends a drain pipe 30.

The riser head 6 terminates in a swivel joint 19 from which the washing fluid conduit 17 leads to the space in the container carrier S under the receivers 60 and there it is connected, as may best be seen in Fig. 6, to a substantially circular conduit 21 which terminates in an inwardly disposed portion 22 including a pressure relief valve 21¹.

As before stated, the rinsing fluid conduit 13 extends axially through the riser head 6 and includes a swivel joint 20 from which the pipe 19 leads to the space in the container carrier S under the receivers 60 where it is connected (see Fig. 4) to a circular conduit 23 spaced inwardly from the conduit 21. The conduit 23 includes an inwardly extending portion 24 having a pressure relief valve 24¹ therein.

The purpose of the pressure valves 21¹ and 24¹ is to permit the fluids to be delivered to containers at a uniform pressure and their location as well as the location of the portions 22 and 24 will be understood from a consideration of the drainage system to be later described.

From a suitable source (not shown) a compressed air line 25 (see Figs. 4 and 7) including a swivel joint 26 and a pipe 27 leads into the space in the container carrier S under the receivers 60 where it is connected to a circular conduit 28 positioned between the conduits 21 and 23.

From each of the conduits 21, 23 and 28, branch lines 21^b, 23^b, and 28^b lead to the intake ports 21^a, 23^a, and 28^a of the valve casing 33 as may best be seen in Fig. 12, one of which is positioned beneath each receiver 60 and supported between the walls 57 and 57^a (see Figs. 4, 5, 6, and 7).

The nozzle 31 extends from the valve casing 33 through the receiver floor 57^b and is connected through the valve casing 33 by a by-pass 33¹ opening into the casing 33 at 33^a and 33^w while an air conduit 31^a passes axially through the nozzle 31 and enters the casing 33 at 31^d. The nozzle 31 is provided with a spray cap 31^b.

On each side of the air inlet 28^a, are valve drains 33^a (Figs. 5, 6, 7 and 14) adapted to discharge at substantially the same place as the receiver drain 30 as will be hereinafter more completely described.

Within the valve casing 33, there is a valve generally indicated by the reference numeral 34 which consists of a rod 35 carrying three pairs of members 34^a, each pair of which is adapted, on proper positioning, to connect a desired intake port with the appropriate outlet port.

In operation intermediate of the connection of washing and rinsing fluids to the nozzle 31, air is connected by the middle pair of members 34^a and during this time, adjacent members of adjacent pairs are adapted to permit fluid to drain from the nozzle and parts of the valve casing 33 common to both fluids. These pairs of members, and these inlet ports and outlet ports are

so arranged that when one conduit as defined thereof is open to the nozzle, the other pairs of members 34^a close the other inlet ports. Furthermore, the valve 34 may be positioned to close all conduits. The movements of the valve above described may be fully appreciated from Figs. 5, 6 and 7.

The rod 35 is slidably guided through the inner wall 55 and is provided with a roll 35^a adapted to contact cams in the cam track 37 supported by the circular wall 1^a on the base 1.

Before considering the cams above referred to and the drainage system utilized to return each fluid from the rotating container carrier S to its tank of source, I will describe the means utilized to exhaust fluids from the interior of the containers.

For the details of construction, reference may be made to Figs. 9, 10 and 11. As shown, a suction chamber 32 is suitably mounted on the floor 57^b of each receiver 60 adjacent the nozzle 31. Suction is created therein by the rush of air therethrough as through the pipe 32^a extending through the floor 57^b and entering the valve casing 33 as when air is being injected into a container C through the nozzle portion 31^a.

As shown in Fig. 11, the suction chamber includes a fluid inlet 32^b which serves as a pivot for and a passage communicating with the arm 38 having a curved tip 38^a. Normally, the tension spring 39 and the stops 39^a keep the tip 38^a adjacent the nozzle 31 so that as the bung hole of a container is placed over the nozzle 31, the edges of said bung hole will bear against the arm 38 forcing the tip 38^a into the lowest point of the container as shown in Fig. 10. In this position, when air passes through the chamber 32, a suction is created effective to withdraw water pocketed in the chime of a canted container through the arms 38 and the chamber 32 where it is discharged into the receiver 60 and escapes through the drain 30.

The drainage system may be clearly understood from a consideration of Figs. 4 and 14. Tanks or compartments 40^a and 40^b on the barrel encircle the wall 1^a and these tanks are supported on conduits 43^a and 43^b separated from one another by a wall 43^c.

The tank 40^a includes a circular portion lying in the path of the end 24 of the rinsing fluid conduit 23 so that whenever there is a discharge therethrough the rinsing fluid may be collected. The tank 40^b includes a similar circular portion in the path of the discharge 22 for the washing fluid conduit 21. The washing and rinsing fluid collecting tanks 40^a and 40^b include enlarged portions in the zone in which the washing and rinsing fluids are connected to the nozzles 31; that is, in the washing zone the tank 40^b is enlarged to lie under drains 30 and the valve drains 33^a; while in rinsing zone, the tank 40^a is enlarged to lie under the drains 30 and the valve drains 33^a.

As, in the form shown in the drawings, I provide two tanks in the base 1 for each fluid, the conduit 43^a for the rinsing fluid has near each end outlets 43³ and 43⁴ open to the tanks R and R^a respectively. Similarly, the conduit 43^b has outlets 43¹ and 43² to the tanks W^a or W respectively.

A valve 41 is provided with each tank 40^a and 40^b to direct the drainage in either direction in the conduits 43^a and 43^b respectively so that the fluid may be returned to the tank of source.

The cams controlling the operation of my device remain to be considered and it is thought

that a full consideration of those cams requires a consideration of the operation for a full understanding of my apparatus.

I use cams mounted on the cam track 37 to establish washing, rinsing, and drying zones through which the container receivers 60 pass as the container carrier S rotates. Each container is reconditioned as the container carrier completes its rotation as to that container so that a loading and removing zone is required so that as the containers are successively reconditioned they may be replaced by dirty containers.

Further as economy of fluids is an essential factor, the washing and rinsing zones are interrupted by a draining of the valves, the receiver, and the container.

These cams, it is thought, may be fully understood from Figs. 1, 6, 7, 8, 9 and 14. The cam 36 is adapted to move each valve 34 to a position in which it closes all the conduits to the nozzle. The loading or removing zone may, therefore, be defined as between the cams 36 and 36^a and as the container receivers 60 pass successively therethrough, containers are removed and replaced. The cam 36^a, when contacted by the rolls 35^a, moves the valve, as may be seen in Fig. 6, so that one pair of members 34^a permit the washing fluid to flow through the nozzle 31. Through this zone, the other parts of members 34^a close the conduits for the air and the rinsing fluid. The washing zone is defined by the arc from cam 36^a to the cam 36^b.

The cam 36^b is adapted to move the valve 34 to connect the rinsing fluid conduit to the nozzle 31 and it is to be noted that a change from one fluid injection to the other requires the longest possible movement of the valve resulting in the central pair of members 34^a connecting the air conduit 28 to the nozzle air pipe 31^a and creating a fluid exhausting suction in the chamber 32 as may be seen in Fig. 7. When the air is thus connected, adjacent members 34^a of adjacent pairs define, as may also be seen in Fig. 7, a drainage conduit to the valve drains 33^a. For that reason, I shape the cam 36^b as may be best seen in Fig. 1 to keep the valve in this position for a sufficient length of time to ensure the complete drainage of the valve casing 33, a container C and the receiver 60 in which it is carried before the container is beyond the enlarged portion of the tank 40^b for the washing fluid and over the enlarged portion of the rinsing fluid collecting tank 40^a and before the rinsing fluid is injected.

The rinsing zone is defined by the arc between cams 36^b and the cam 36^c which latter cam is adapted to move the valves 34 to connect the draining and drying system just described in connection with Fig. 7. The position of the valves in the rinsing zone may be best seen in Fig. 5.

As in the drying zone, (defined by the arc between cam 36^c and the cam 36, which latter cam closes all conduits) containers must be thoroughly dried, this zone is of substantial size.

The cams 36—36^c are blocks secured in the circular track 37. These may be positioned where desired within certain limits as will be obvious from the nature of the drainage collection tanks 40^a and 40^b.

With this functional explanation of my apparatus, its operation may be fully understood. Assuming that a large quantity of containers are to be reconditioned, the tanks are first filled and heated, containers positioned in each receiver 60 over the nozzles 31 result, automatically in the

fluid exhausting arm 38 being properly positioned within the container.

A desired washing fluid tank and a rinsing fluid tank are connected by opening the proper valves 11^a and the valves 41^a are positioned to return drainage collected to its tank of source.

Rotation of the container carrier S is now effective to carry containers through the various zones so that when returned to the loading zone one container will be in a condition to be replaced by a dirty barrel while others are progressively nearing complete reconditioning, the progress of each being determined by the zone in which it is and its position in that zone.

Although the fluids are circulated separately, and scum traps are of assistance, the fluids will eventually become unfit for further use. Most frequently, the washing fluid becomes dirty before the rinsing fluid is in unsatisfactory condition but whenever this condition results the operator need only move the valve 11^a in control of the tank W and open the other valve 11^a in control of the alternate tank and also turn the valve 41^a to direct the return fluid back to the alternate tank as desired. The tank W may then be drained, flushed out, refilled and heated so that my apparatus may remain in continuous operation until all the containers are reconditioned. While effectiveness is the desired result this effectiveness is obtained, in accordance with my invention with efficiency and economy.

What I therefore claim and desire to secure by Letters Patent is:—

1. Apparatus for reconditioning the interiors of containers comprising a base, a support mounted for rotation over said base, a container receiver in said support, a valve casing mounted in said support and having outlet ports communicating with said receiver and a plurality of intake ports, washing and rinsing liquid sources communicating respectively with said intake ports, a valve in said casing, means on said base for operating said valve in timed relation to the rotation of the support to open said ports to deliver said liquids separately to said receiver, and a siphon in said receiver controlled by said valve to exhaust one delivered liquid from the container before the delivery of the other liquid.

2. Apparatus for reconditioning the interiors of containers comprising a base, a support mounted for rotation over said base, a container receiver in said support, a valve casing mounted in said support and having separate outlet ports for air and liquid communicating with said receiver, and a plurality of intake ports, washing and rinsing liquid and compressed air sources each communicating with one of said intake ports, a valve in said casing, means on said base for operating said valve in timed relation to the rotation of said support to open said ports to deliver said liquids separately to said receiver and to deliver compressed air between the deliveries of liquid, and a siphon connected to said casing and operating to exhaust the delivered liquid from the container when compressed air is passing thereinto.

3. The apparatus of claim 1 in which the means on the base for operating the valve are a plurality of fixed cams disposed for successive contact with the valve as it rotates therepast.

4. Apparatus for reconditioning the interiors of containers comprising a support, a container receiver in said support, washing and rinsing liquid sources, an air source, valve controlled means in said support to connect said sources separately

to a container positioned in said receiver, means for automatically operating said valve controlled means in timed order, and a siphon in said receiver controlled by said valve controlled means to exhaust one delivered liquid from the container in said receiver while air is being delivered to said container and before the delivery of the other liquid to the container.

5. The apparatus of claim 4 in which the siphon is mounted in the receiver and includes a suction chamber open to said receiver and operably connected with said valve controlled means when air is being delivered to the container, and means communicating with said chamber and designed to extend into the interior of the container.

6. In apparatus for reconditioning the interiors of containers, a base, a support rotatably mounted on said base, a container receiver carried by said support, a washing liquid tank, a rinsing liquid tank, valve controlled means for delivering said liquids separately from said tanks to a container positioned in said receiver, said means including an independent conduit for each liquid, a portion of each conduit being rotatable with said support, a pressure relief valve in each rotatable portion, said relief valves having concentric paths, a drain from said receiver delivering intermediate the paths of said rotatable relief valves, means to actuate said valve controlled means and means to return the used liquids to their tanks of source, said return means comprising a tank mounted on said base beneath said rotating support and a separate circular drainage collection compartment for each liquid disposed in the path of rotation of each pressure relief valve, each compartment communicating with the tank of source for its respective liquid, and each compartment being enlarged in the path of said receiver drain to receive the liquid therefrom during the delivery of that liquid to said receiver as determined by said means to actuate said valve controlled means.

7. Apparatus for reconditioning the interiors of containers comprising a support, a container receiver in said support, a valve casing mounted in said support and having outlet ports communicating with said receiver and a plurality of intake ports, washing and rinsing liquid sources communicating respectively with said intake ports, a valve in said casing, means for operating said valve in timed order to open said ports to deliver said liquids separately to a container positioned in said receiver, and a siphon in said receiver controlled by said valve to exhaust one delivered liquid from the container before the delivery of the other liquid.

8. Apparatus for reconditioning the interiors of containers comprising a support, a container receiver in said support, a valve casing mounted in said support and having separate outlet ports for liquids and air communicating with said receiver and a plurality of intake ports, washing and rinsing liquids and air sources each communicating with one of said intake ports, a valve in said casing, means for operating said valve in timed order to open said ports to deliver air between the deliveries of liquids, and a siphon connected to said receiver and controlled by said valve and operating to exhaust the delivered liquids from a container positioned in said receiver when air is passing thereinto.

9. Apparatus for reconditioning the interiors of containers comprising a container support, a valve casing and a nozzle mounted in said support,

said valve casing having separate outlet ports for air and liquid communicating with said nozzle, and a plurality of intake ports, washing and rinsing liquid and air sources communicating respectively with said intake ports, a valve in said casing, means to actuate said valve to open said ports to deliver said liquids separately through said nozzle to a container in said support, and to deliver air to said container between the deliveries of liquid thereto, and a siphon operated by air delivered to said container to exhaust liquid from the container.

10. Apparatus for reconditioning the interiors of containers comprising a container support, washing and rinsing liquid sources, an air source, valve-controlled means to connect said sources separately to a container in said support, means operating said valve-controlled means in predetermined order, and a siphon for exhausting liquid from the container, said siphon being controlled

by the valve-controlled means and being operated by air delivered to the container.

11. Apparatus for reconditioning the interiors of containers comprising a container support, means to deliver washing and rinsing liquids separately to a container in said support and to deliver air between the deliveries of liquid, and a suction member operated by the delivery of air to the container to exhaust liquid from the container.

12. Apparatus for reconditioning containers comprising a support, a container receiver in said support, means including a valve control to deliver separately washing liquids, rinsing liquids and air to a container positioned in said receiver, and suction means operated by the delivery of air to said container to exhaust liquid from the container.

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