

Nov. 4, 1930.

A. L. WASHBURNE
BOTTLE CLEANSING MACHINE

1,780,772

Filed Nov. 27, 1928

3 Sheets-Sheet 1

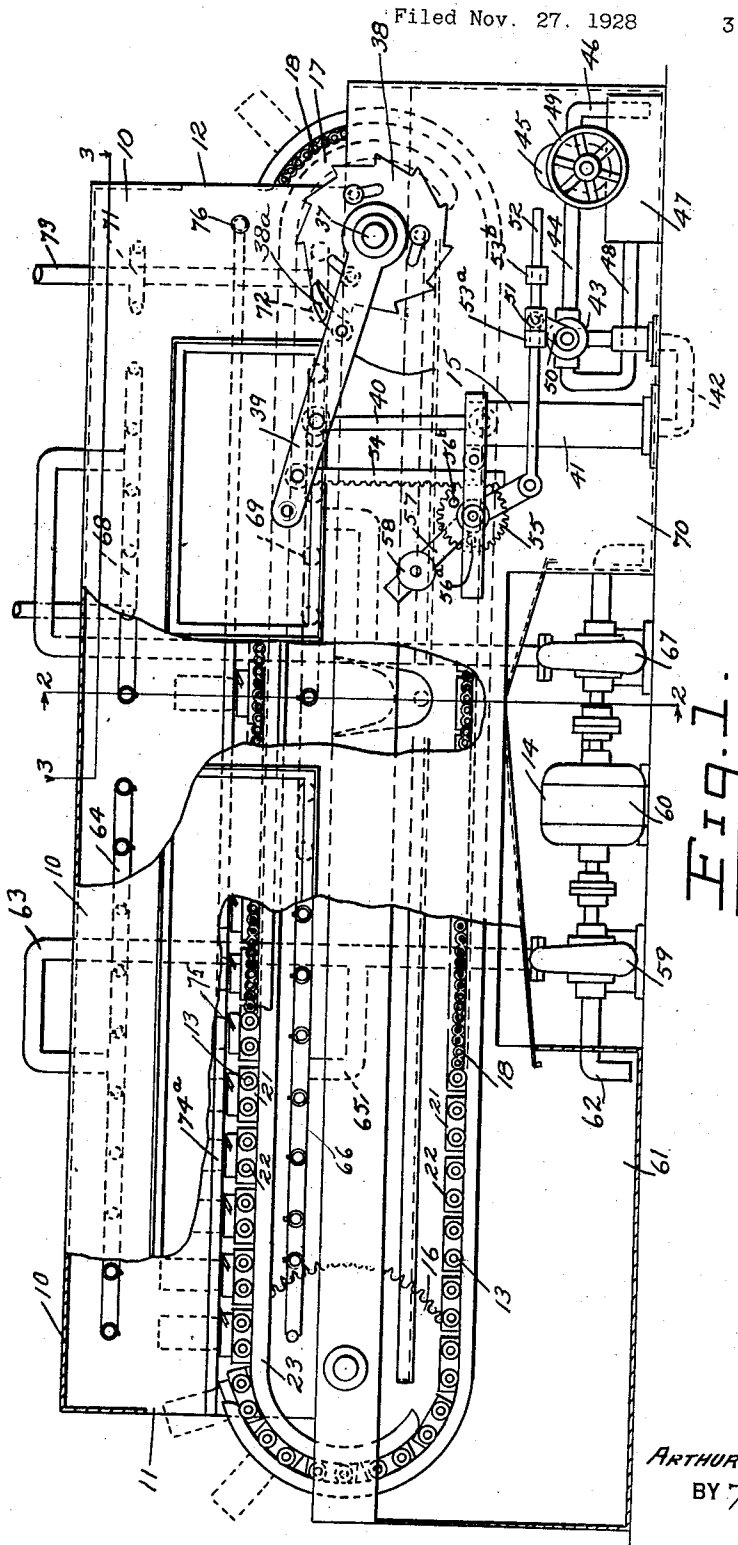


Fig. 1.

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Fig. 3.

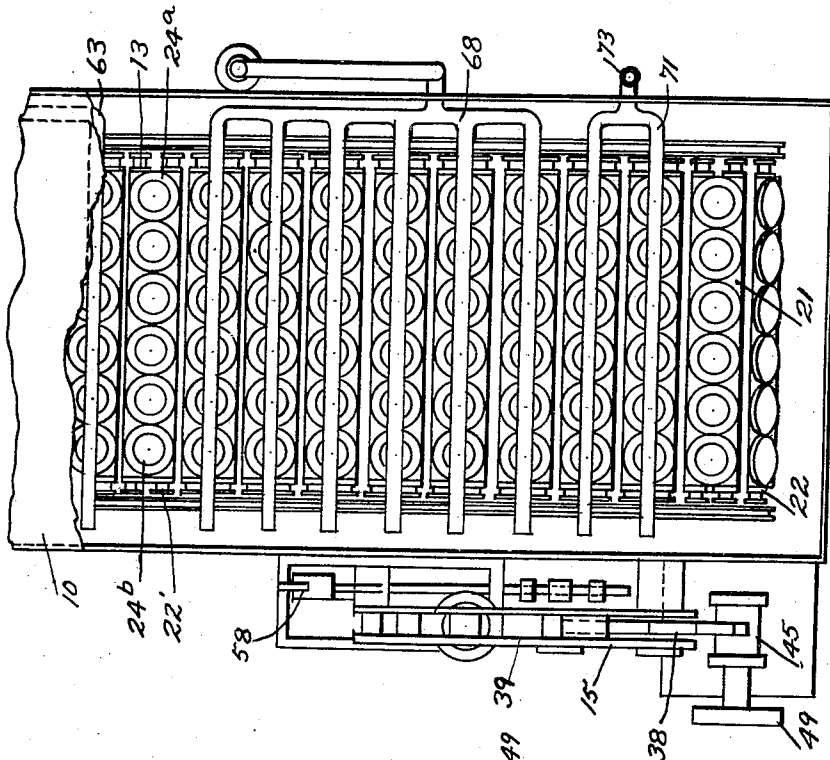
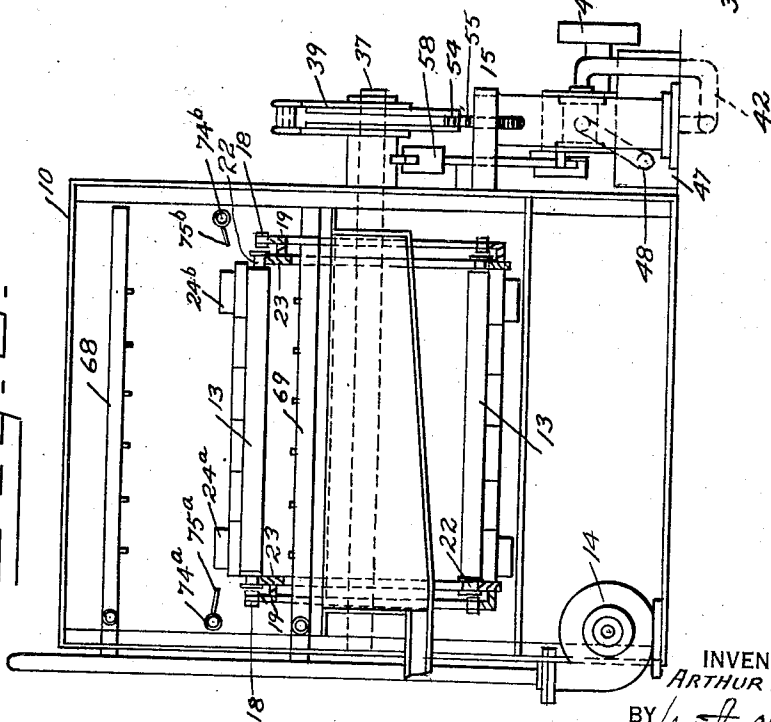


Fig. 2.



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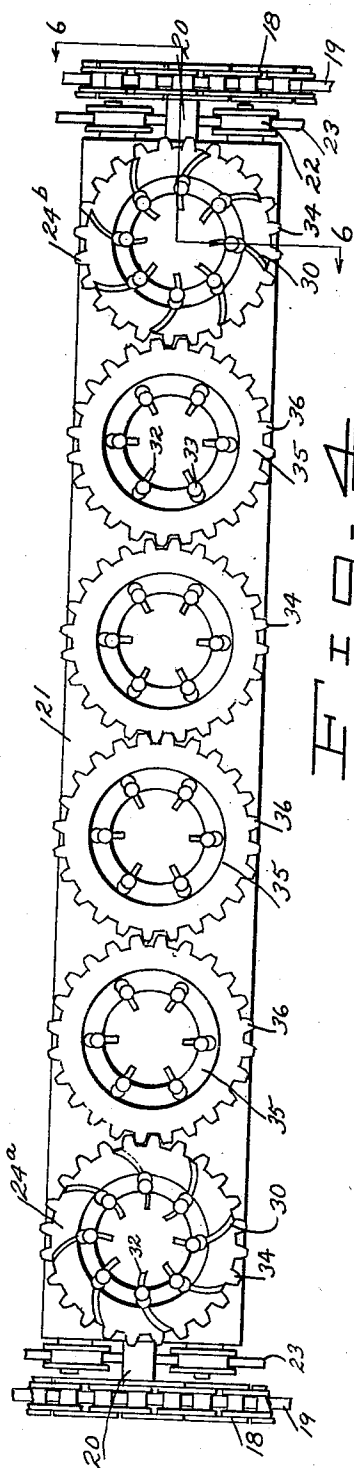
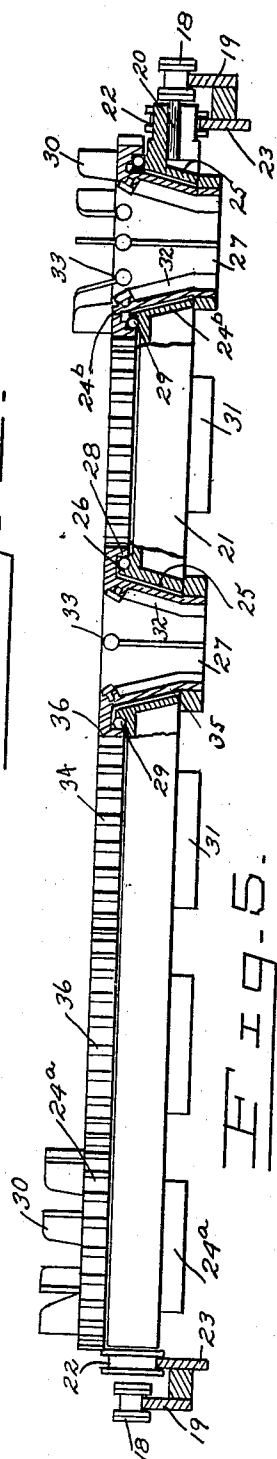
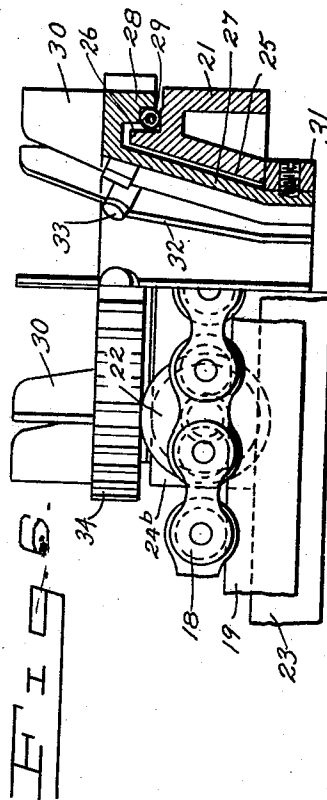
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3 Sheets-Sheet 3



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BOTTLE-CLEANSING MACHINE

Application filed November 27, 1928. Serial No. 322,132.

This invention relates to the art of cleansing bottles, demijohns and like receptacles hereinafter referred to broadly as bottles. In such devices, it is advisable to flush the bottles inside and out, with cleansing fluid, then with a disinfectant or deodorizing material, and finally to rinse them with a clear liquid such as the bottle is to hold. The particular embodiment of the invention disclosed herein comprises a machine adapted to clean demijohns for holding drinking water. However, the machine is applicable to cleansing of receptacles for any purpose.

The primary object of this invention is to provide a machine which can be charged with bottles to be cleaned and will advance the latter, automatically completing the cleansing of the bottles without the necessity of manual contact therewith. A more specific object of this invention is to provide a machine having an endless conveyor and turret collars disposed so as to be rotated during their travel and sprayed with cleansing liquid. A still more specific object of this invention is to provide a machine of the character described wherein the bottles are rotated during their travel with the conveyor. A still further specific object of this invention is to provide a machine of the character described wherein the bottles are advanced with the container step by step, cleansing fluid being projected over the exterior of the bottles and into the interior.

These objects together with other objects and corresponding accomplishments are obtained by means of the embodiment of my invention illustrated in the accompanying drawing in which:—

Fig. 1 is a side elevation of a complete cleansing machine, portions being broken away to better illustrate the construction; Fig. 2 is a section as seen on the line 2—2 of Fig. 1; Fig. 3 is a diagrammatic plan view of a fragment of the machine; Fig. 4 is a plan view on an enlarged scale of a flight plate of the conveyor with turret collars thereon; Fig. 5 is an elevation of the flight plate shown in Fig. 4, partly in medial section; and Fig. 6 is a side elevation of the flight showing an

impeller collar half in elevation and half in section.

Referring with more particularity to the drawing and especially Fig. 1, a housing 10 is shown covering the conveyor and having a bottle charging opening 11 for loading the conveyor with bottles, and a delivery opening 12 for unloading of the cleansed bottles. A conveyor for the bottles is indicated generally by 13. Pump mechanism for delivery of cleansing liquid and disinfecting liquid is marked 14, and operating means for intermittently advancing the conveyor is marked 15.

Referring more in detail to the conveyor, there are journaled in a frame of the housing at the charging and delivery ends shafts carrying sets of sprocket wheels 16 and 17. Passed over the sprocket wheels are chains 18, the upper runs of which ride upon rails 19. Pintles 20 extend inwardly from the chains and are mounted upon sockets in flight plates 21. Journaled upon stub shafts extending from the plates are truck wheels 22 which travel upon rails 23, thereby supporting the weight of the flights and the bottles mounted thereon. Rotatably supported at the end of each flight plate are rotor collars 24^a and 24^b. These collars are of like construction, and one will be described. Each flight plate has a downwardly tapered opening 25 and at the larger end of the opening is provided with an upstanding annular rib 26. Mounted therein is a collar turret member 27. A flange 28 overhangs the rib 26 and is recessed to provide space for a ball race 29. Upstanding from the turret are impeller vanes 30 forming turbine vanes. A retaining ring 31 is mounted upon the smaller end of the turret to hold the latter in position upon the flight plate. The construction just described is such that the collar is free to rotate. Extending longitudinally of the turret and in the throat thereof are ribs 32 serving as spacer supports for bottles. Rubber bumpers 33 in the form of buttons are mounted in sockets for engaging the shoulders of the bottles. Gear teeth 34 are provided upon the flange 28. The intermediate collars comprise turret

members 35 provided with gears 36 and mounted so as to be freely rotated upon the flight. They are similar in construction to the end turret collars except that they are not provided with vanes. The gears thereon mesh with one another to form a train of gears from one end of the flight plate to the other.

The conveyor is advanced intermittently in steps of the width of a flight plate through the operating mechanism 15. The shaft 37 to which sprockets 17 are secured has affixed thereto a ratchet wheel 38. Pivottally mounted upon the shaft 37 is a lever arm 39 having a pawl 38^a for engagement with the ratchet teeth. The lever and ratchet mechanism are connected so that by oscillating the lever, the conveyor will be intermittently advanced. Pivottally secured to the lever 39 is a connecting rod 40 attached to the plunger of a reciprocating liquid motor 41. Connected to the cylinder of the motor is a pipe line 42 controlled by a valve 43. The valve 43 may be a three-way valve of the rotary type and of any well known construction. One branch of the valve is connected by a pipe line 44 to the discharge side of a pump 45. The inlet side of the pump has a pipe line 46 connecting it to a reservoir 47. Another branch of the valve is connected by a pipe line 48 to the reservoir 47 and constitutes the discharge branch for the valve. The pump may be operated from a pulley 49 by suitable belting or by any other convenient means. The operating arm 50 of valve 43 has a block 51 secured thereto and slidably mounted upon a rod 52 between spaced tappets 53^a and 53^b. Connected to the lever 39 is a rack rod 54 meshing with a gear 55 so as to oscillate the latter in correspondence with the oscillation of lever 39. Pins 56^a and 56^b are provided on the gear 55 to embrace a fall-over lever 57. The fall-over lever is pivotally mounted about the axis of the gear 55 and has a weight 58 at the upper end. The lower end thereof is connected to the rod 52.

The operation is as follows:—Assuming valve 43 is positioned to connect pipe line 42 from the cylinder of motor 41 to the exhaust line 48, the weight of lever 39 and its associated parts will cause the motor plunger and connecting rod 40 to be moved by gravity downwardly, but ratchet wheel 38 will not be moved. This causes the lever 57 to be swung toward the right and the tappet 53^b to be moved toward the slide block 51. When the plunger has reached its lower position, lever 57 will be upright and slightly over center toward the right and tappet 53^b will be engaged with block 51. Thereupon the weight 58 will cause the lever to complete its movement until it engages the pin 56^b. In such movement slide block 51 is moved by the tappet 53^b toward the left and the valve 43 is dis-

posed to connect the pressure pipe line 44 to pipe line 42. Fluid under pressure is now supplied to the plunger cylinder causing the plunger to be raised and moving the ratchet wheel 38. In the upward movement of the plunger, lever 39 is swung upwardly raising rack rod 54, turning gear 55, and raising fall-over lever 57 until it reaches its over center position. At its mid position tappet 53^a engages slide block 51, and the weight 58 on the lever causes it to complete its movement, shifting valve 43 to connect the motor cylinder to the exhaust line 48. This operation continues in cycles.

The pump mechanism 14 includes a pump 59 operated from a motor 60. In the base of the machine is a sump 61 to receive cleansing fluid which is sprayed over the bottles. The intake side 62 of the pump is connected to the sump. A pipe line 63 connects the discharge side of the pump to an overhead spray system consisting of pipes 64 having nozzles directed downwardly. Another branch 65 connects the discharge side of the pump to a spray system disposed below the upper run of the conveyor and comprising pipes 66 having upwardly directed nozzles. These nozzles are so spaced that a jet of liquid will be directed into the mouth of each bottle when the conveyor is at rest. It will be noted however that the spraying system just described only extends for a portion of the length of the housing, it being disposed in a cleansing zone. The overhead spraying nozzles are disposed to direct jets of liquid directly upon the bottles, when they are stationary. The liquid used may be any well known cleansing liquid solution. A second pump 67 is operated from motor 60 and supplies liquid to an overhead system of piping 68 and to a system of piping below the conveyor indicated by 69 and having nozzles. The last described system is similar to the one before described. A sump 70 is provided in the base of the housing to receive the liquid from nozzles 68 and 69 and supply it to the pump 67. The zone of the machine in which spray systems 68 and 69 are disposed is the disinfectant portion of the machine. The liquid used may consist of water charged with chlorine gas, or any other suitable liquid disinfectant and deodorant. At the discharge end of the housing are spray pipes 71 and 72 having nozzles and fed from a pipe line 73. These are disposed in a rinsing zone, and it is preferable to supply rinsing liquid such as the liquid with which the bottles are to be filled. In the case of water, the rinsing liquid may be water from the same source as that with which the bottles are to be filled.

Extending along the sides of the conveyor are pipes 74^a and 74^b having sets of spray nozzles 75^a and 75^b. These spray nozzles are disposed to direct jets of liquid against the vanes of the rotor collars. The nozzles are

preferably spaced so that their distances apart are equal to the width of a flight plate, and when the bottles are in their stationary position during their travel, the jets of liquid will be projected against the vanes and cause the collars to be rotated. The liquid as used is supplied to an intake pipe 76 and may be the same liquid as is used in the pipe line 73. The liquid striking the vanes will be discharged therefrom over the bottles and acts as a spray to cleanse. It is obvious that the pipe lines 74^a and 74^b may be divided into sections in which liquid corresponding to the ones used in the corresponding zones may be used.

In the operation of the machine, each flight or tray is loaded with bottles at the charging end of the machine, by inserting the bottles in the collars. As the bottles are moved to the machine they are sprayed internally and externally first by the cleansing liquid. They are rotated during their cleansing operation so that a complete cleansing action of the walls is obtained. After the bottles have passed the cleansing zone, they enter the disinfectant and deodorizing zone and a similar operation is performed upon the bottles with the disinfectant and deodorant liquid. They are finally rinsed and discharged at the delivery end 12. The intermittent operation of the machine provides for convenient charging of the conveyor with bottles and unloading at the discharge end.

What I claim is:—

1. In a cleansing machine, a conveyor, transverse rows of turret collars for receiving bottle necks, the collars being rotatably mounted on said conveyor, one of said collars constituting a turbine rotor, and means to project fluid against said rotor to rotate the latter, the collars in a row being geared so as to be rotated together.

2. In a cleansing machine, a conveyor, transverse rows of turret collars for receiving bottle necks, the collars being rotatably mounted on said conveyor, one of the collars in each row having impeller vanes and the collars in each row being geared together, and means to direct jets of fluid against said vanes to rotate the collars.

3. In a cleansing machine, a conveyor, transverse rows of turret collars for receiving bottle necks rotatably mounted on said conveyor, the end collars of each row constituting turbine rotors, the collars in a row being geared together, and means to project fluid against the said rotors for rotating the latter.

4. In a cleansing machine, a conveyor, transverse rows of turret collars for receiving bottle necks rotatably mounted on said conveyor, the end collars of each row having impeller vanes, the collars in a row being geared together, and means to direct jets of fluid against said vanes to rotate the collars.

5. In a cleansing machine, a conveyor, tur-

ret collars for receiving bottle necks rotatably mounted on said conveyor, impeller vanes upstanding from said collars, and means to direct a jet of fluid against said vanes.

6. In a cleansing machine, a conveyor, transverse rows of turret collars for receiving bottle necks rotatably mounted on said conveyor, one of the collars of each row constituting a turbine rotor and being geared to the remaining collars of the row, nozzles spaced along the side of said conveyor to project fluid against the rotors to rotate the latter, and means to intermittently advance said conveyor the distance between nozzles.

7. In a cleansing machine, a conveyor, transverse rows of turret collars for receiving bottle necks rotatably mounted on said conveyor, the end collars of each row constituting turbine rotors and being geared to the remaining collars of the row, nozzles spaced along the sides of said conveyor to project cleansing fluid against the rotors to rotate the latter, and means to intermittently advance said conveyor the distance between nozzles.

8. In a cleansing machine, a conveyor, transverse rows of turret collars for receiving bottle necks rotatably mounted on said conveyor, one of the collars of each row having impeller vanes, nozzles spaced along the conveyor to direct jets of fluid against said vanes to rotate the last mentioned collars, the collars in each row being geared together, and means to intermittently advance said conveyor the distance between nozzles.

9. In a cleansing machine, a conveyor, transverse rows of turret collars for receiving bottle necks rotatably mounted on said conveyor, the end collars of each row having impeller vanes, the collars in each row being geared together, nozzles spaced along the sides of said conveyor to direct jets of fluid against said vanes, and means to intermittently advance said conveyor the distance between nozzles.

In witness that I claim the foregoing I have hereunto subscribed my name this 14th day of September, 1928.

ARTHUR L. WASHBURN.