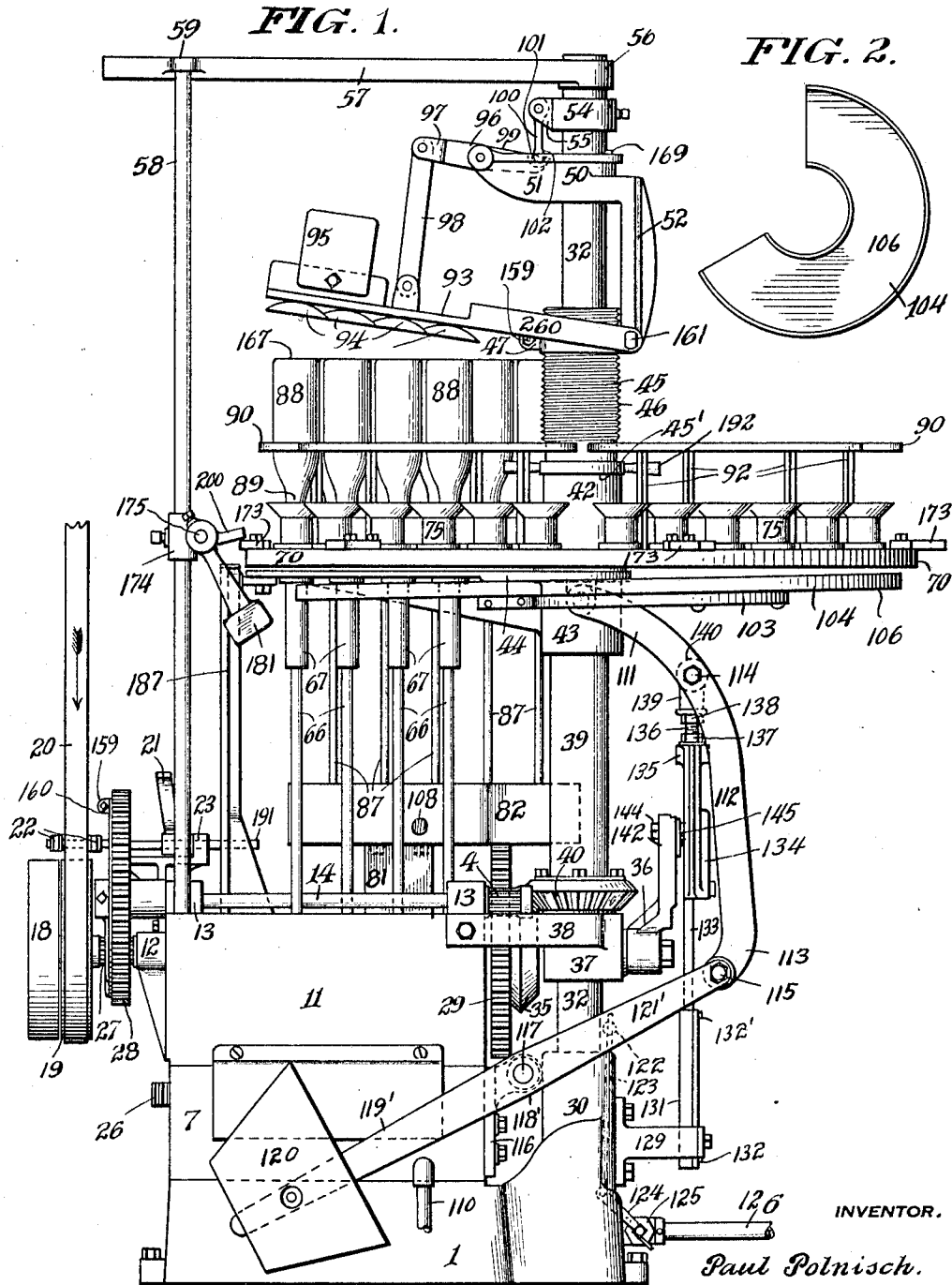


P. POLNISCH.
BOTTLE CLEANING MACHINE.
APPLICATION FILED DEC. 29, 1910.

1,020,156.

Patented Mar. 12, 1912.

5 SHEETS—SHEET 1.



INVENTOR.

Paul Polnisch.

WITNESSES:

Daniel Webster, Jr.
Jm Porter

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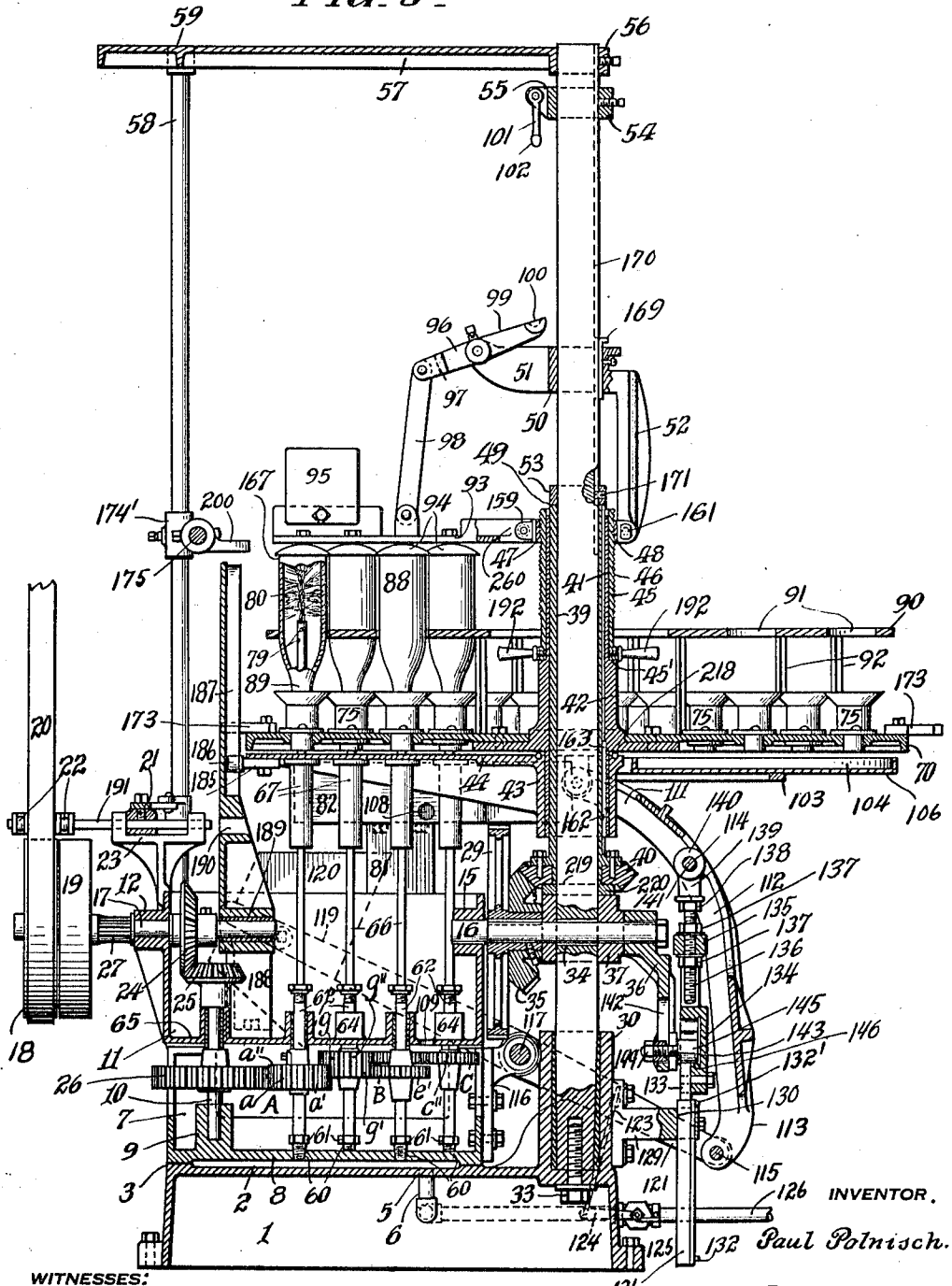
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5 SHEETS—SHEET 3.

FIG. 5 -



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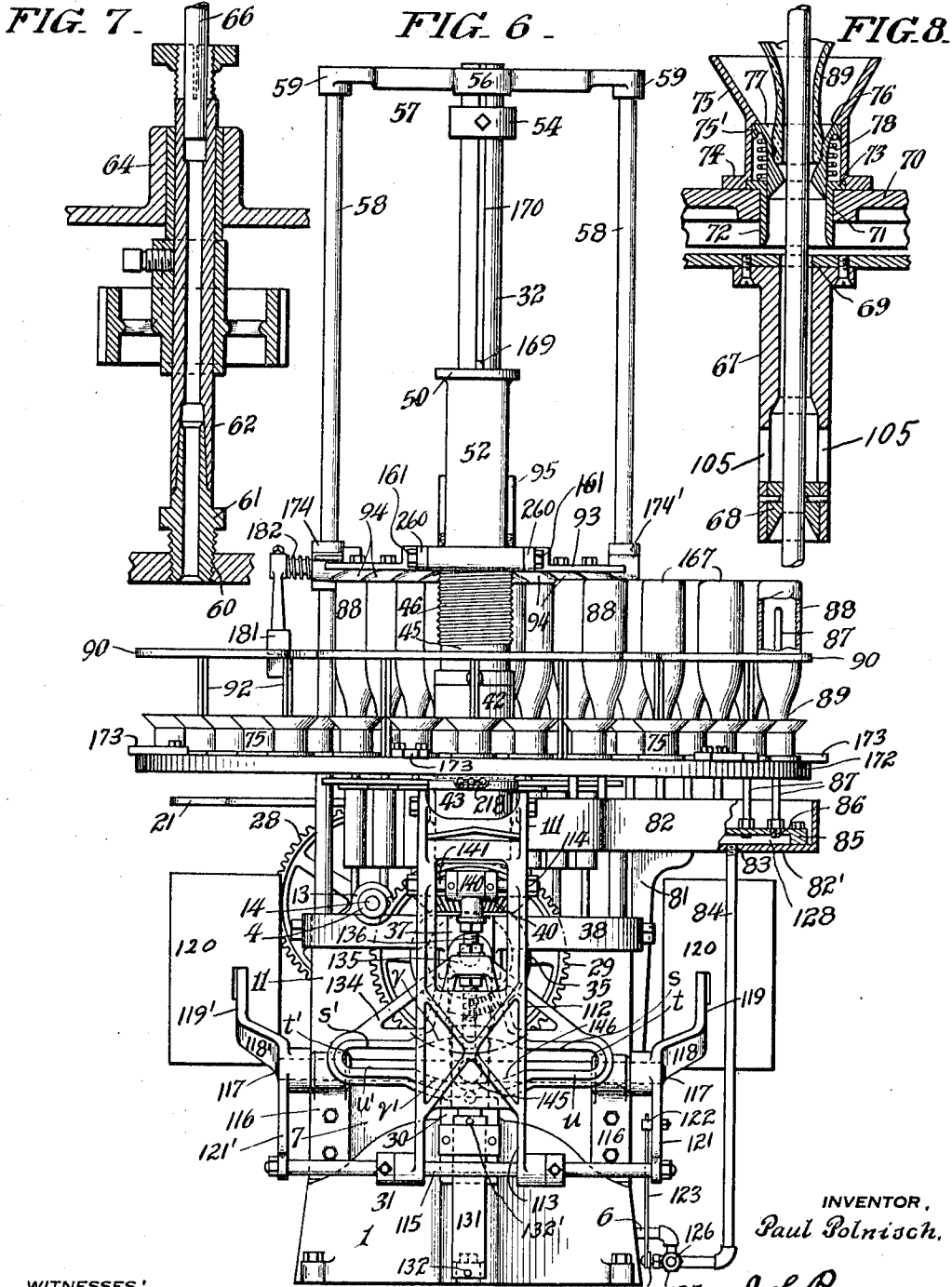
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5 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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BOTTLE-CLEANING MACHINE.

1,020,156.

Specification of Letters Patent.

Patented Mar. 12, 1912.

Application filed December 29, 1910. Serial No. 599,952.

To all whom it may concern:

Be it known that I, PAUL POLNISCH, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in a Bottle-Cleaning Machine, of which the following is a specification.

My invention relates to bottle washing machines and is in the nature of new and useful improvements upon the bottle washing and rinsing machine described and illustrated in the application for Letters Patent of the United States filed Jan. 24, 1910, Ser. No. 539,852, comprising trays for carrying bottles mounted in crates and operated by a device for converting the continuous rotary motion of a power shaft in a vertical plane into a continuous rotary motion of washers in a horizontal plane and into an intermittent periodic rotary motion of a gear of a sleeve and the periodic harmonic motion of a slotted bar.

The chief object of my present invention is to provide a turn table for carrying a large number of bottles past brush carrying spindles and rinser tubes vertically grouped under the table; a further object of this invention is to provide the table with yielding mouth pieces wherein the mouths of bottles could be clamped without crushing the bottles; a further object of this invention is to guide the brushes and rinsers centrally into the bottles; a further object of this invention is to move the bottles relative to the brushes and rinsers in straight lines; a further object of this invention is to simultaneously wash and rinse a large number of bottles; a further object of this invention is to provide a safety device for preventing any injury to the machine on account of overloads, and a still further object of this invention is to provide means for operating the machine automatically.

With these and other objects in view my present invention consists of the construction, combination and the arrangement of parts as will be hereinafter more fully described and claimed and illustrated in the accompanying drawings, it being understood that changes in form, size, and other minor details may be within the scope of my claims, without departing from the spirit or

sacrificing any of the advantages of this invention.

In the accompanying drawings, Figure —1, is a side-elevation of the machine; Fig. —2, is a plan view of a drip-pan in connection therewith; Fig. —3, is a plan view of the machine; Fig. —4, is a plan view of a train of gears in connection therewith; Fig. —5, is a cross-sectional side elevation of the machine; Fig. —6, is a rear elevation thereof; Fig. —7, is a cross-sectional elevation of a spindle and its operating device; Fig. —8, is a cross-sectional elevation of a spindle and of the guiding device in connection therewith; Fig. —9, is a front-elevation partly in section of an automatic throw-out in connection with the machine; Fig. —10, is a section thereof, and Fig. —11, is a detail view of a pair of miter gears in connection with the machine.

Similar figures refer to similar parts throughout the several views.

A base 1, is provided with a reservoir 2, on its top 3, having a tap 5, for a water supply pipe 6. On top of the base is mounted a gear-chest 7, having a bottom 8, provided with a bearing 9, for a vertical transmitter shaft 10. On top of the chest is mounted a water-trough 11, provided with a bearing 12 for a power-shaft 17, with bearings 13, 13 for a horizontal transmitter-shaft 14, and with a bearing 15 for a driving shaft 16. On the power shaft is mounted a loose pulley 18 and a tight pulley 19, for a belt 20. A handle 21, operates a belt shifter 22, mounted on a rod 191 supported by a bracket 23.

On the power shaft 17 and inside the trough 11, is mounted a driving gear 24, meshing with a driven gear 25 mounted on the vertical shaft 10. On the shaft 10 is also mounted a driving gear 26. On the power shaft is also mounted a driving gear 27, meshing with a driven gear 28 of the horizontal shaft 14. On the shaft 14, is mounted a driving gear 4, meshing with a driven gear 29 mounted on the driving shaft 16.

The base 1, is provided with a vertical socket 30, at its rear 31, wherein is mounted a post 32, by a bolt 33. The post 32, is vertically supported by a band 37 of a bracket 38, mounted on the trough 11. The post 32,

is bored to form an opening 34 for the driving shaft 16 to pass through.

On the driving shaft 16, between the trough 11 and the post 32, is mounted a driving gear 35. On the post 32, above the supporting band 34, is mounted a ring 220, provided with a bearing-face 219, for a sleeve 39, on which is mounted a follower-gear 40, meshing with the driver 35. On the sleeve 39, above the gear 40, is mounted a sleeve 41, provided with a hub 42. On the sleeve 41, under its hub 42, is mounted a collar 43, carrying a tray 44, and above the hub 42, is mounted a sleeve 45, provided with a thread 46, and with a bearing face 45' for the hub 42. On the sleeve 45, is mounted a split collar 47, provided with a thread 48, engaged with the thread 46 of the collar 45. The split collar 47 is fastened around the sleeve 45 by means of a clamp 159. On the post 32, above the sleeve 39, is mounted a ring 53, provided with a bearing-face 49 for the sleeve 39. On the post 32, above the ring 53, is mounted a collar 50, provided with a bracket 51, and with a vertical arm 52 joining the collar 50 with the collar 47. On top of the post 32 is mounted the rear end 56, of a platform 57, whose front 59 is supported by posts 58, 58. On the post 32, under the platform 57, is mounted a collar 54, provided with a bracket 55.

The bottom 8, of the chest 7, is provided with taps 60, for nozzles 61. Over the nozzles 61, are revolvably mounted tubular journals 62, carrying gears of a train 63, driven by the gear 26 of the shaft 10.

The train 63 is arranged in the three horizontal planes, comprising a low plane A, a middle plane B and a high plane C. The plane A embraces the lower face a' of a double-faced gear a and the gears b, c, d, e ; the plane B embraces the upper face a'' of the double-faced gear a , the lower face g' of the double-faced gear g and the gears b', c', d', e', f' ; the plane C embraces the upper face g'' of the double-faced gear g and the gears b'', c'', d'' . The driving gear 26 meshes with the gear a . The lower face a' meshes with the gears b' and d . The gear b meshes with the gear c and the gear d meshes with the gear e . The upper face a'' of the gear a meshes with the gear b' and with the lower face g' of the gear g . The lower face g' of the gear g meshes with the gears d' and e' . The gear b' meshes with the gear c' , and the gear e' meshes with the gear f . The upper face g'' of the gear g meshes with the gear b'' ; the gear b'' meshes with the gear c'' , and the gear c'' meshes with the gear d'' .

The journals 62 are supported by bearings 64 on the bottom 65 of the trough 11. Spindles 66 are vertically supported by the journals 62 and are free to revolve in bear-

ings 68, of cylinders 67, which are suspended from the tray 44, around its apertures 69. The spindles are provided with orifices 79 and above the orifices are vertically mounted brushes 80.

On the hub 42 of the sleeve 41, is mounted a turn-table 70, provided with apertures 71. The apertures 71 surround hollow cylinders 72 which are provided with flanges 73 above the table 70. Over the flanges 73 and around the apertures 71 are mounted the flanges 74, of hollow cylinders 75, provided with shoulders 76. Wedge cylinders 77, provided with shoulders 75', are mounted under the shoulders 76 of the cylinders 75. Spring coils 78, are wound around the cylinders 77 under their shoulders 75' and over the flanges 73 of the cylinders 72.

The cylinders 75 are uniformly distributed over the table 70, which is divided into sections 70' of a regular polygon whose center coincides with that of the table 70. Each section is provided with fourteen cylinders 75, uniformly distributed along radial lines. The spindles 66, which pass through the cylinders 67, of the tray 44, are confined within a space equal to one section of the table 70 and are distributed along radial lines and concentric with the cylinders 75.

A rinsing trough 82 is supported by a bracket 81 at an angle with and above the trough 11. The trough 82 has its bottom 82' provided with a tap 83 for a water supply pipe 84. In the trough 82 is mounted an inverted pan 85 to form a reservoir 128 above the bottom 82'. The reservoir 128 is provided with taps 86 for rinsing-tubes 87 which are uniformly distributed over a section adjacent to that of the spindles and concentric with the cylinders 75, of a section 70' of the table 70. On the table 70 are mounted posts 92 which support a frame 90, provided with apertures 91 concentric with the cylinders 75, for vertically supporting the bodies of inverted bottles 88, whose necks 89 are inserted in the cylinders 75.

The split collar 47, carries a pin 161, pivotally supporting the arms 260 of a clamping device 93. From the clamping device 93 are suspended disks 94, for engaging the bottoms of a group of bottles of a section of the table centrally above a group of brushes 80. On the clamping device 93 is mounted a weight 95. On the bracket 51, of the collar 50, is pivoted a lever 96, having an arm 97 pivotally connected with the clamping device 93, by a bar 98, and an arm 99 provided with a recess 100. On the bracket 55, of the collar 54, is pivotally suspended a pin 101 provided with a cap 102, for engaging the recess 100. On the tray 44 is mounted a bracket 103 which carries a drip-pan 104 rearwardly of the spindles and of the rinsers. The pan 104 is provided with a bottom 106 and is in-

clined to drain the water from the bottles after they have been washed and rinsed into the trough 82. The trough 82 is provided with a drain 108 for draining into the
 5 trough 11, which is provided with a drain 109 for draining into the chest 7 provided with a drain-pipe 110. A lever 112, having a fulcrum 114, is provided with arms 111, pivoted on the collar 43, and with arms
 10 113, carrying a rod 115. On the chest 7 is mounted a bracket 116, carrying a rod 117 on which are pivoted levers 118 and 118'. The levers are provided with arms 119 and 119', carrying weights 120, and with arms
 15 121 and 121' pivoted on the rod 115. On the arm 121, of the lever 118, is mounted a bracket 122 slidably supporting a rod 123, pivoted on a handle 124, operating a valve 125, of a water-main 126 supplying water
 20 through the pipes 6 and 84, to the reservoirs 2 and 128.

On the socket 30, of the base 1, is mounted a bracket 129, provided with a slot 130 slidably supporting a vertical guide 131.
 25 provided with stops 132 and 132'. A slotted bar 134 is fixedly connected with the guiding bar 131 by a bar 133. The slotted bar 134 is provided with a collar 135, carrying a pin 136 adjustably mounted therein by lock-nuts 137. On the pin 136 is adjustably
 30 mounted the leg 139, of a T 140, by a lock-nut 138. The T 140 carries a horizontal rod 141 pivoted on the fulcrum 114, of the lever 112.

On the shaft 16, in rear of the post 32, is mounted a crank 36, provided with a slotted arm 142 along which is clamped a pin 143 by a nut 144. On the pin 143 is mounted a roller 145 to roll inside the
 40 slotted bar 134 which consists of a horizontal section *s*, joined to a section *u* equal and opposite to said section *s* by a section *t* of a radius equal to that of the roller, of a section *v* having a radius equal to the distance
 45 of the center of the roller from the axis of the crank plus the radius of the roller joined with the section *s* and with a section *s'* equal and opposite to the section *s*, said section *s'* joined with a section *u'* equal and opposite
 50 to the section *s'* by a section *t'* equal and opposite to the section *t*, said sections *u* and *u'* joined by a section *v'* which is equal and opposite to the section *v*.

The driving gear 35 has a section 147 of its periphery subtending an angle equal to that subtended by a section of the table 70 provided with bevel teeth, and a smooth section 148 of a diameter approximately equal to that of its pitch cone. The toothed section 147 is provided with end teeth 147' which are joined with the smooth section 148 by inclinations 149.

The follower 40 is divided into sections, each subtending an angle equal to that subtended by a section of the table and provided

with teeth 150 of the same pitch and outline as the teeth of its driver 35, said sections joined together by lock teeth which extend to the pitch cone of the gears and whose outer faces 157' are joined by concave surfaces 151
 70 for the convex surface 148 of the driver 35 to roll over. The object of the inclinations 149 is to permit the convex surface 148 to pass the middle of a lock-tooth and to release it just before an end tooth engages the
 75 side of a lock-tooth and commences to revolve the follower, said end teeth being heavy the better to withstand the shock caused at the moment of engagement.

The crank 36 is keyed on the shaft 16 in
 80 such a position that the first line of contact between a heavy tooth of the driver 35 and the first tooth of a section of the follower 40 and the line of contact between the roller 145 and the beginning of the section *v* of
 85 the slotted bar lie approximately in a plane through the axis of the shaft 16.

The relative positions of the other elements of the machine are as follows:—The tray 44, of the sleeve 43, is above the brushes
 90 which are confined within the cylinders suspended from the tray. The cylinders 77 of one section of the table 70 are centrally above the brushes while the next succeeding section in the direction of motion, as indicated by the arrow shown in Fig. 3, is centrally above the rinsers 87. The clamping device 93 is centrally above the tray at a distance which is sufficient to permit the bottoms of the bottles carried by the table to
 100 pass by the disks suspended from said clamping device. The arm 99 of the lever 96 is depressed by the pin 101 which causes the bar 98 to hold the clamping device in the oblique position shown in Fig. 1. The
 105 remaining sections of the table are directly above the drip-pan 104. The slotted bar 134 is at its highest position and the valve 125 is closed to cut off the water from the reservoirs.

Assume that the machine is now started by shifting the belt 20, by means of the belt shifter 22, from the loose to the tight pulley. The tight pulley 19 rotates the shaft 17, and its motion is transmitted by its gears 27 and
 115 24 to the gears 28 and 25 respectively. The shaft 10 rotates with the gear 25 and the gear 26 mounted thereon drives the double-faced gear *a* of the train 63. The gear *a* drives the gears *b*, *b'*, *g* and *d*; the gear *b*
 120 drives the gear *c*, the gear *b'* drives the gear *c'*, and the gear *d* drives the gear *e*. The gear *g* drives the gears *d'*, *b''* and *c'*; the gear *c'* drives the gear *f*, the gear *b''* drives the gear *c''*, and the gear *c''* drives
 125 the gear *d''*. The spindles 66 are rotated by the train 63 as long as the machine is in operation.

The gear 28 is mounted on a bearing 152, of a collar 153 bolted on the transmitter 130

shaft 14. The collar is provided with a bracket 154 carrying a ring 156 which is surrounded by the rim 155 of the gear 28. The ring 156 is provided with a split 158.

5 The split ring 156 carries a socket to one side of the split and a bracket on the opposite side thereof. The bracket 159 is bored and threaded for a bolt 160 screwed through the bore and extending inside the socket 157

10 to press against a spring-coil 161 mounted therein. The bolt may be adjusted to produce a sufficient tension on the spring for causing the split ring to clutch the gear 28 to be revolved thereby when the shaft 14

15 carries a normal load. The moment the load becomes abnormal, the gear 28 commences to slip on the split ring, with the result that the split ring remains stationary.

When the load is normal, the gear 28

20 which meshes with the gear 27, of the power shaft 17, transmits the motion of said shaft to the shaft 14 through the split ring 156. The gear 4, of the shaft 14, meshes with the gear 29 of the shaft 16 which is thereby

25 caused to rotate continuously with the power shaft 17 as long as the load is normal. The gear 35 and the crank 36, mounted on the shaft 16, revolve continuously with said shaft. The gear 40 which meshes with the

30 gear 35, is rotated intermittently during the engagement of its teeth with the teeth of the gear 35 and transmits said intermittent motion to the sleeve 39 mounted on the post 32 around which it is free to revolve between the rings 53 and 220. The sleeve 39

35 is provided with a key-way 162, for a key 163 of the sleeve 41 which is slidably mounted on said sleeve 39. The sleeve 41 is thus constrained to revolve with the sleeve

40 39 but is also free to slide thereon. The table 70, mounted on the hub 42 of the sleeve 41, is periodically revolved by the sleeve 39 and during such a period of motion one of its sections is transposed from a position

45 over the tray 44, to a position above the rinsers, transposing the next succeeding section from its position over the rinsers to a position over the drip-pan, and a section from a position over the drip-pan to a position over the tray. During the aforesaid

50 movement, the roller 145 carried by the arm 142 of the crank 36 rolls over the section *v* of the slotted bar 134, which section subtends an angle equal to that subtended by the toothed section of the gear 35, and the bar therefore remains stationary. At the moment the teeth of the gears 35 and 40 become disengaged, the roller 145 enters the

55 section *s* and rolls over said section and over the sections *t* and *u*. During the aforesaid movement, the slotted bar descends, while the smooth section of the gear 35 rolls over a lock-tooth of the gear 40, said gear 40 remaining stationary. The roller then enters

60 the section *v'* and during its movement

along this section the slotted bar remains stationary, while the smooth section of the gear 35 continues to roll over the aforesaid lock-tooth. The roller then enters the section *u'*, and as it rolls over said section and

70 over the sections *t'* and *s'* the slotted bar ascends, while the smooth section of the gear 35 continues to roll over the aforesaid lock-tooth of the gear 40 and the gear 40 remains stationary while the gear 35 completes a

75 revolution. The movement of the slotted bar is transmitted through the lever 112 to the collar 43 and to the weight carrying levers 118 and 118', one of which levers is

80 operatively connected with the valve 125. When, therefore, the slotted bar descends, the valve is opened and the water from the main 126 is free to flow through the pipes 6 and 84 into the reservoirs 2 and 128, thence

85 through the nozzles into the spindles and through the orifices around the brushes, and also through the rinsers. As the valve is opened, the collar carrying the tray 44 slides down, and the brushes are forced out

90 of the tray cylinders and through the tray apertures. The sleeve 41 which is free to slide on the sleeve 39 follows the collar 43 and the brushes and rinsers are forced inside the bottles of the sections of the table centrally above the spindles and rinsers.

95 After the slotted bar has descended, it stops for a period which is coincident with the movement of the smooth section of the gear 35 over a lock-tooth of the gear 40. The table, therefore, remains stationary while a

100 group of bottles are washed by the brushes, a group of bottles are rinsed by the rinsers, a group of rinsed bottles are being drained, while drained bottles are removed and unwashed bottles are mounted on the table.

105 When the slotted bar ascends, the valve is closed, and the water is cut off from the brushes and from the rinsers. The collar 43 ascends and is followed by the sleeve carrying the table. The brushes and rinsers

110 are forced out of the bottles. The tray cylinders now surround the brushes and as the brushes revolve the dirty water is pressed out and the dirt wiped away.

From the above it will be observed that,

115 while the gear 35 and the crank 36 are made to revolve continuously in parallel, vertical planes, the gear 40 is made to revolve periodically in a horizontal plane, and the slotted bar 134 is made to move with a periodic reciprocatory motion in a vertical

120 plane. During one complete revolution of the gear 35 and of the crank 36, the gear 40 rotates while the bar 134 is stationary, then stops while the bar descends, the bar then

125 stops for a period equal to the period of motion of the gear 40 the said gear continuing stationary, the bar then ascends during a period equal to its period of descent the gear 40 having continued stationary. There thus

130

results a cycle of operations of a period equal to that of one revolution of the shaft 16 and comprising a period of motion of the gear 40 corresponding to a period of rest of the bar 134, of a descending movement of the bar corresponding with a period of rest of the gear and equal to two periods of its motion, followed by a period of rest of the bar corresponding with a period of motion, and of an ascending movement of the bar corresponding with a further period of rest of the gear and equal to the period of the descending movement of the bar.

The sleeve 41 which is provided with a key 163 slidably mounted in the key-way 162 of the sleeve 39 is revolved periodically by the gear 40 and during the motion of the gear 40 the table 70, carried by the hub 42 of the sleeve 41, is revolved until a section is carried from a position above the brushes to a position above the rinsers and is then stopped. The collar 43 commences to descend with the tray 44, which causes the cylinders 67 to slide down the spindles 66. As the collar 43 descends, the sleeve 41 slidably supported above said collar descends with the table and the cylinders 72 and 75 of the section of the table above the brushes are forced down the spindles which are forced through the apertures 69 of the tray 44 above the cylinders 67. The collar 45 follows the sleeve 41 together with the collar 47 clamped around said collar 45 and with the collar 50 rigidly connected with the collar 47. As the collar 50 descends, the lever 96 is released by the pin 101 and the weight 95 causes the clamping device 93 to assume a position parallel with the table. The disks 94, suspended from the clamping device, are now in a position to press against the bottoms of the bottles whose necks are inside the cylinders 75 and whose bodies are supported in the apertures 91 of the frame 90. The brushes 80 are thus forced inside the bottles carried by the section of the table above the spindles and the rinsers project inside the bottles carried by the section of the table which is now centrally above said rinsers. As the collar 43 descends, the valve opens and water is forced through the spindles and rinsers into the bottles for washing and rinsing. The collar 43 is then caused to ascend while the valve is closing. The upward movement of the collar 43 is transmitted to the sleeve 41 and is further communicated to the collar 50 until the recess 100 of the lever pivoted on the collar 50 engages the cap 102 of the pin 101 pivoted on the bracket 55 of the collar 54. When the recess 100 becomes thus engaged, the lever 96 is operated to cause the clamping device 93 to lift the disks 94 off the bottoms of the bottles of the section of the table above the spindles. The table is now free to revolve,

and as this occurs at the moment when the teeth of the gears 35 and 40 become engaged and when the roller 145 enters the section *v* of the slotted bar, the sleeve 41 is prevented from sliding but is forced to revolve with the sleeve 39 and the table is caused to revolve. The lever 112, which is now stationary, prevents the collar 43 from revolving, and the key 169 of the collar 50 in the key-way 170 of the post 32 prevents said collar 50 from revolving. The collar 45 is held by the collar 47 which is rigidly connected with the collar 50. The vertical displacement of the sleeve 39 is prevented by the ring 53 fastened on to the post 32 by the machine screw 171. The table 70 revolves so long as the teeth of the gears 35 and 40 are engaged, and stops after it has revolved through an angle equal to that subtended by the toothed section of the gear 35.

It will be observed that, for the proper operation of the machine, it is essential that the table should come to a stop after its period of rotation in such a position that the brushes and rinsers would enter the bottles. This is accomplished in the following manner:—Each section of the table is provided with a lug 173 having a beveled face 183. On the posts 58 are mounted brackets 174 and 174' revolvably supporting a horizontal rod 175. On the rod 175, between the posts and near the bracket 174, is mounted a lug 178, provided with a face 184 and carrying a pin 179. On the end 180 of the rod 175 is mounted a weight 181, and between said weight and the bracket 174 is wound a spring 182. On the rod 175, between the lug 184 and the bracket 174', is mounted a lug 200, which is always directly above a table lug when the table is moved either up or down. When the table is made to ascend a table lug presses against the lug 200 which causes the rod 175 to turn until it is counter-acted by the weight 181. As this occurs at the moment when the roller 145 enters the section *v* of the slotted bar, the downward pressure of the weight 181 is sufficient to cause the lug 200 to stop the table, which coincides with the position in which the table is free to pass by the brushes and rinsers. The table is now in its plane of revolution, and as it commences to revolve, the table lug is moved from under the lug 200. The weight 181 is now free to cause the rod 175 to turn, until it is stopped by the pin 179 coming in contact with the bracket 174. The lug 200 is now parallel with the table and directly in its plane of revolution. As the table continues to revolve in the direction of the arrow shown in Fig. 3, the lug 200 is met by a table lug with the result that the rod 175 is forced to slide and the spring 182 becomes compressed between the weight 181 and the bracket 174. The tension thus developed in the spring is sufficient to cause

the lug 200 to prevent the table from being revolved by its momentum after the teeth of the gears 35 and 40 are out of engagement. This causes the table to stop when the group of bottles to be washed are centrally above the brushes and a group of washed bottles are centrally above the rinsers. When the table is made to descend, the lug held by the lug 200 descends with the table and the lug 200 is released. The spring is now free to expand which brings the lug 200 to its position centrally above the table lug.

To prevent the lateral displacement of the tray 44, when its collar 43 is made to slide up and down, or when the table 70 is revolved with its hub 42 over the ball-bearings of the collar 43, I provide a guide 187, vertically supported by a bracket 188, mounted in the trough 11. The tray 44 is provided with a bracket 185, carrying a roller 186 to roll along the inner surface of the guide 187. The bracket 188 is also provided with a bearing 189 for the power shaft 17 and with a recess 190 for the rod 191 of the belt shifter 22.

When the table descends, the weight 95 forces the clamping device 93 to assume a horizontal position, and a group of bottles become clamped between the disks 94 and the cylinders 77 actuated by the springs 78. The bottles are thus held firmly and are prevented from becoming displaced by the revolving brushes. The position of the disks 94 relative to the bottoms of the bottles is adjusted by loosening the clamp 159, when the collar 45 can be turned by means of the handles 192 to cause the collar 45 to either ascend or descend until the clamping device 93 is in the proper position.

It will be observed that the machine illustrated in the drawings is built for handling six groups of fourteen bottles each, and the only manual labor required is to remove drained bottles and mount unwashed bottles. The same kind of a machine can be built for handling either a larger or a smaller number of groups of bottles, with more or less bottles per group.

With the arrangement as above described, drained bottles can be constantly removed and unwashed bottles mounted on the table, and as the bottles are handled directly and without the intervention of crates, which might sometimes interfere with the free movement of the machine, it may be operated at a very high speed.

Having thus described my invention, what I now claim as new and desire to protect by Letters Patent is:—

1. In a bottle cleaning machine, the combination of orificed brush-carrying spindles, journals mounted on the spindles below the orifices, a spindle trough provided with bearings for the journals, gears mounted

on the journals under the spindle trough, a chest supporting the trough, a base supporting the chest and forming therewith a reservoir between the two, and nozzles mounted in and tapped onto the chest and revolvably supporting the journals.

2. In a bottle cleaning machine, the combination of orificed brush-carrying spindles, a spindle trough through which the spindles extend, gears for driving the spindles located below the trough, a chest inclosing the gears, and whose bottom forms the top of a reservoir beneath the gear chest, and means on said bottom connecting the spindles with the reservoir permitting them to rotate on their axes.

3. In a bottle washing machine, the combination of orificed brush-carrying spindles, a spindle trough through which said spindles extend, gears for driving the spindles located below the trough, a chest inclosing the gears and supporting the trough, a base supporting the chest and forming therewith a reservoir between the two, and nozzles mounted in and tapped onto the chest and revolvably supporting the journals.

4. In a machine of the character described, the combination of spindles provided with orifices and with brushes above the orifices, journals mounted on the spindles below the orifices, a spindle trough provided with bearings for the journals, gears mounted on the journals under the spindle trough, a chest supporting the trough, a base supporting the chest and a reservoir between the chest and the base, nozzles mounted in the chest and tapped on its reservoir revolvably supporting the journals, a rinser trough above and at angle with the spindle trough and provided with a reservoir, rinsers consisting of tubes provided with orifices mounted in the rinser trough and tapped on its reservoir, water supply pipes tapped on the reservoirs, a water main and a valve connecting the main with the supply pipes, a tray provided with apertures for the spindles to pass through and cylinders suspended from the tray under its apertures and provided with bearings for the spindles, and a table provided with apertures, a frame provided with apertures centrally above the table apertures and fixedly supported by posts above the table substantially as described and for the purposes set forth.

5. In a machine of the character described, the combination of spindles vertically supported along radial lines of a horizontal plane, journals mounted on the spindles, a spindle trough provided with bearings for the journals and gears of a train mounted on the journals for revolving the spindles, in a chest supporting the trough, a base under the chest and a reservoir between the base and the chest, nozzles

tapped on the reservoir revolubly supporting the journals, a rinser trough supported at an angle with and above the spindle trough and provided with a reservoir, rinsers vertically mounted in said rinser trough and tapped on its reservoir along radial lines of a horizontal plane similar to that of the spindles, pipes tapped on the reservoirs, a main and a valve connecting the main with the pipes, a tray provided with apertures along radial lines corresponding with the spindles, cylinders suspended from the tray around the apertures and provided with bearings for the spindles, a circular table provided with apertures along radial lines corresponding with those of the spindles radiating from its center, a frame provided with apertures centrally above the table apertures and posts supporting the frame at a fixed height above the table, substantially as described and for the purposes set forth.

6. In a bottle cleaning machine, the combination of a bottle-carrying turn-table, brush-carrying spindles and rinser tubes thereunder, means for rotating the table to bring the mouths of bottles in line with the brushes and rinsers, means for imparting a relative up and down movement between the table and the brush carrying spindles and rinser tubes for directing the brushes and rinsers in a set of the bottles, and a yieldingly mounted lug in line of travel of the table for checking the movement of the table when the bottles are centrally above the brushes and rinsers.

7. In a bottle cleaning machine, the combination of a turn-table movably mounted on a vertical post, brush-carrying spindles and rinser tubes thereunder, means for rotating the table past the spindles and tubes, means for imparting a relative reciprocable movement between the table and spindles, vertical posts in front of the table, a horizontal rod movably supported on said posts, and a lug mounted on the rod for overcoming the momentum of the table.

8. In a bottle cleaning machine, the combination of a bottle carrying turn-table provided with yieldingly mounted mouth-pieces under the mouths of the bottles, brush-carrying spindles and rinser-tubes under the

table, means for rotating the table to bring the mouths of bottles in line with the brushes and rinsers, means for imparting a relative up and down movement between the table and the brush carrying spindles and rinser tubes for directing the brushes and rinsers in and out of the bottles, vertical posts in front of the table, a horizontal rock-shaft movably supported thereon, a lug yieldingly mounted thereon for checking the movement of the table when bottles are centrally above the brushes and rinsers.

9. In a bottle cleaning machine, the combination of a turn-table, brush-spindles and rinsers thereunder, a tray under the table provided with hollow cylinders having bearings around the brush-spindles, and a guide in front of the tray for directing the brush-spindles centrally through said cylinders.

10. In a bottle cleaning machine, the combination of a turn-table, brush-carrying spindles and rinser-tubes thereunder, a follower for rotating the table past the spindles and tubes, a pair of levers for imparting a relative reciprocable movement between the table and the spindles, a shaft, a driver meshing with the follower and a crank provided with a pin mounted on said shaft, a rod joining the levers, an arm pivoted on the rod, and a joint pivoted on the rod operatively engaging the pin.

11. In a bottle cleaning machine, the combination of a turn table, brushes and rinsers thereunder, a follower for imparting an intermittent rotary movement to the table, and a pair of levers for imparting a relative reciprocable movement between the table and the brushes during an intermission of the rotary movement, a driver meshing with the follower, a rod joining the levers and an arm pivoted thereon, a bar provided with a slot pivoted on the arm, means vertically guiding the bar, a crank provided with a pin to roll in the slot, and means for guiding the rolling pin along the surface of the slot.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

PAUL POLNISCH.

Witnesses:

EMANUEL KLINE,
ROBERT LUSSE.