May 12, 1942. S. R. HOWARD 2,282,474

RECEPTACLE CLEANING MACHINE

Filed Oct. 6, 1937 4 Sheets-Sheet 1

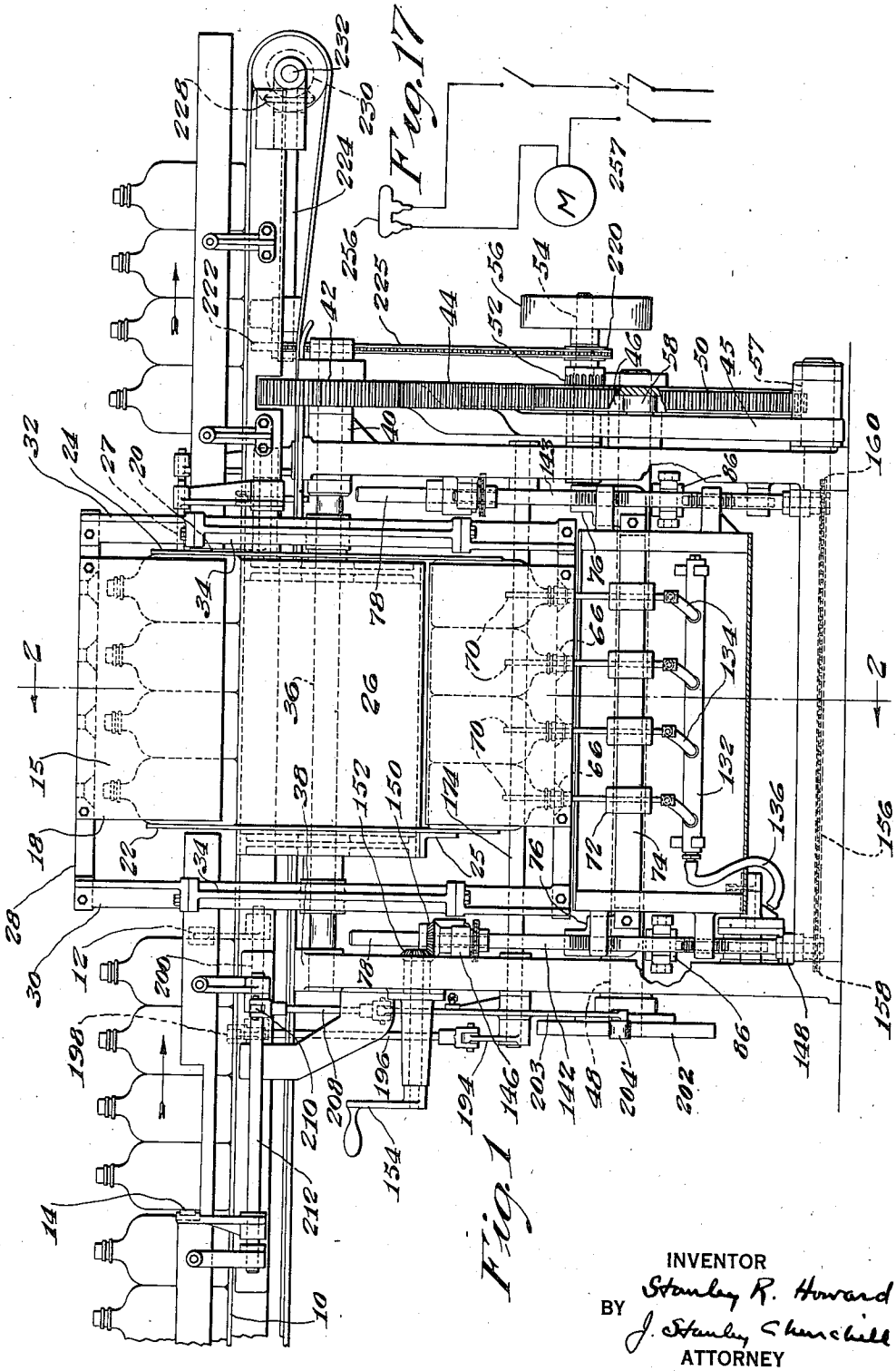


Fig. 1

Fig. 17

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RECEPTACLE CLEANING MACHINE

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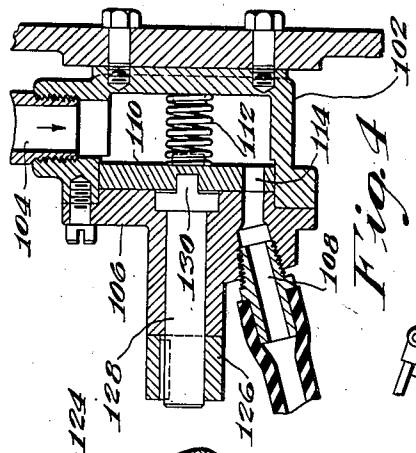


Fig. 4

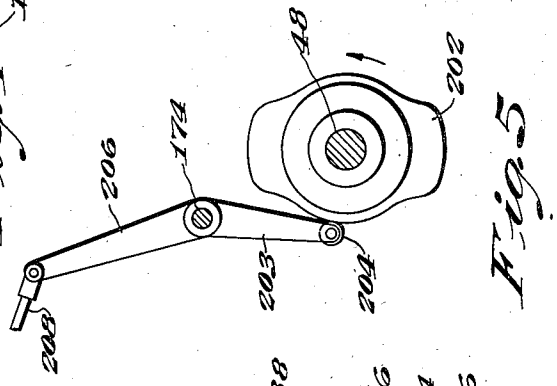


Fig. 5

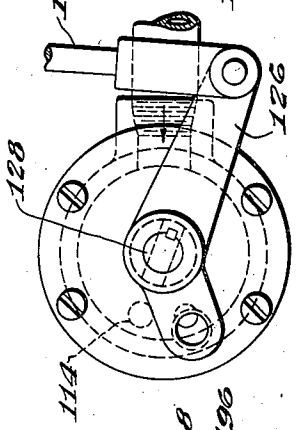


Fig. 3

Fig. 2

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RECEPTACLE CLEANING MACHINE

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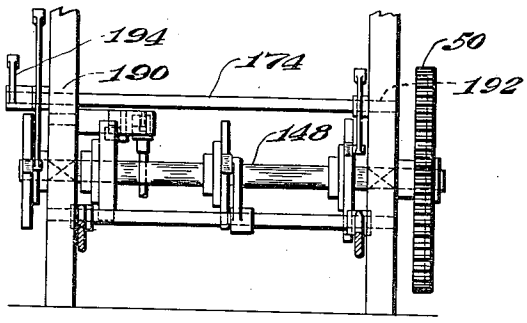


Fig. 8

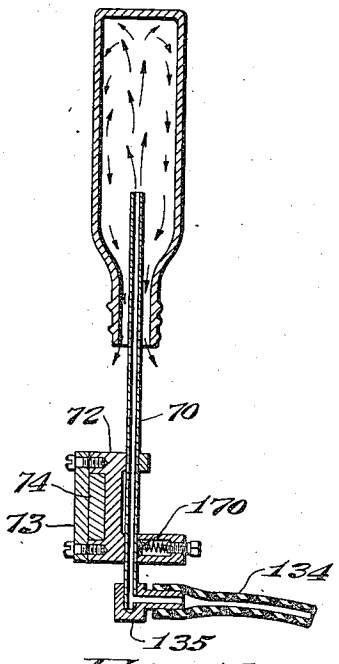


Fig. 7

Fig. 6

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RECEPTACLE CLEANING MACHINE

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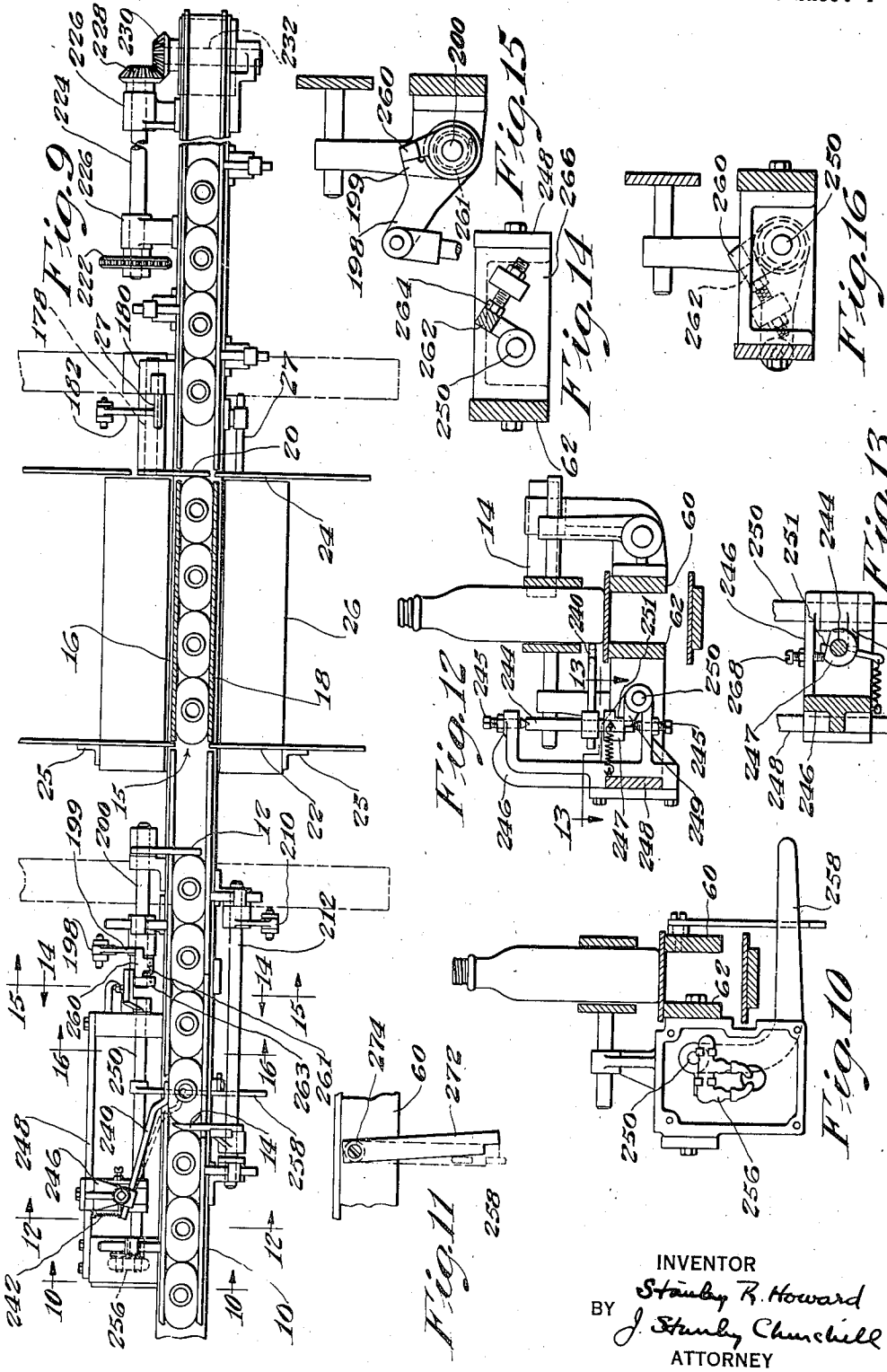


Fig. 9

Fig. 15

Fig. 14

Fig. 16

Fig. 12

Fig. 13

Fig. 10

Fig. 11

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UNITED STATES PATENT OFFICE

2,282,474

RECEPTACLE CLEANING MACHINE

Stanley R. Howard, Milton, Mass., assignor to Pneumatic Scale Corporation, Limited, Quincy, Mass., a corporation of Massachusetts

Application October 6, 1937, Serial No. 167,571

13 Claims. (Cl. 15—20)

This invention relates to a receptacle cleaning machine and more particularly to a bottle cleaning machine.

The object of the invention is to provide a novel and improved receptacle cleaning machine adapted to clean receptacles in a superior and high efficient and rapid manner.

With this general object in view and such others as may hereinafter appear, the invention consists in the machine for cleaning receptacles and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a front elevation of the receptacle cleaning machine; Fig. 2 is a cross section on the line 2—2 of Fig. 1; Figs. 3 and 4 are details in front elevation and cross section respectively of an air valve to be referred to, the section being taken on the line 4—4 of Fig. 2; Fig. 5 is a detail of a cam to be referred to; Fig. 6 is a side elevation of the machine shown in Fig. 1 viewed from the right and illustrating the driving mechanism; Fig. 7 is a cross sectional detail of the receptacle cleaning device; Fig. 8 is a detail of the cam shaft; Fig. 9 is a plan view of the conveyor and associated mechanism shown in Fig. 1; Fig. 10 is a cross section on the line 10—10 of Fig. 9; Fig. 11 is an enlarged detail of a portion of the safety device, to be referred to; Fig. 12 is a cross section on the line 12—12 of Fig. 9; Fig. 13 is a sectional plan view illustrating a portion of the mechanism shown in Fig. 12, taken on the line 13—13 of Fig. 12; Figs. 14 and 15 are end views of a part of the mechanism shown in Fig. 9, as viewed from lines 14—14 and 15—15 respectively; Fig. 16 is a sectional view taken on the line 16—16 of Fig. 9; and Fig. 17 is a wiring diagram to be referred to.

In general, the present invention contemplates a machine for cleaning receptacles in which provision is made for first inverting the receptacles to be cleaned and thereafter introducing a stream of air into the receptacles to remove any small or foreign particles therefrom. In the preferred embodiment of the invention, which as above stated is adapted for cleaning bottles, provision is made for automatically releasing a plurality of bottles, standing upright on a conveyor, to a position within a pocket formed by guide rails which are arranged to be rocked to transfer the bottles around a stationary drum to an inverted position beneath the drum and in alignment with a series of air nozzles. In the preferred form, the machine is provided with two pockets spaced 180 degrees apart so that while one set of bottles is being cleaned the previously cleaned set of bottles may be removed and a new set of bottles to be cleaned may be released for the next cycle of operation. While the bottles are in their inverted position provision is made for raising the air nozzles to extend within the bottles and for causing a stream of air to flow into the bottles to remove any foreign particles therefrom. Thereafter the air nozzles are withdrawn and the cleaned bottles are rotated 180 degrees to again rest on the conveyor while a new set of bottles is being transferred into position to be cleaned.

Referring now to the drawings, in the illustrated machine a supply of bottles to be cleaned is fed into the machine on an incoming conveyor 10. Provision is made for controlling the feed of the bottles into the machine and, as herein shown, the line of bottles is permitted to advance up to a stop member 12. During the operation of the machine, when the stop 12 is automatically withdrawn to release a new set of bottles in the machine, as will be described, a second stop 14 is operated to hold back the main supply of bottles on the conveyor and to permit the released bottles to advance into the machine within a pocket 15 formed by guide rails 16, 18 and up against a third stop 20. This final stop holds the bottles in alignment with rotary guide rails 22, 24 supported upon a stationary drum 26 by angle pieces 25 and studs 27. The stops 12, 20 operate simultanously, as will be described, so that as one set of cleaned bottles is being conveyed out of the machine, the new set of bottles to be cleaned is being advanced into position to be inverted and cleaned.

Referring now to Figs. 1, 2 and 6, the bottles to be inverted and cleaned are stationed on the conveyor 10 within the pocket 15 in which the bottles are retained during the inverting and cleaning operation. As illustrated herein, the guide rails 16, 18 are secured to a cross bar 28 extending between rocker arms 30, 32, mounted upon rocking members 34 which are secured to a rocker shaft 36. The shaft 36 is supported in bearings 38, 40 in the machine frame and is arranged to be alternately rocked 180 degrees clockwise and 180 degrees counterclockwise in timed relation to the operation of the cleaning and bottle releasing mechanisms. As herein shown, see Figs. 1 and 6, the shaft 36 is rocked through mechanism including a gear 42, secured to the end of the shaft 36, which meshes with a

segment 44 provided on a rocker arm 45 which is operated by a cam 46 mounted on the main cam shaft 48. The cam 46 is formed integrally with a gear 50 which is driven by a pinion 52 mounted on a driving shaft 54. The driving shaft 54 is driven in any usual or preferred manner as by a motor, not shown, belted to a pulley 56 secured to the driving shaft 54. The rocker arm 45 is pivoted on a short stud 57 and is provided with a cam roll 58 which cooperates with the path of the cam 46. As will be seen from inspection of Figs. 1 and 6, the conveyor 10 extends through the machine and through the stationary drum 26 and, as herein shown, the drum is supported upon side rails 60, 62 of the conveyor. It will also be noted that a cut-out 64 is provided in the gear 42 to permit the gear to be rocked without interfering with the conveyor belt.

As the bottles are rotated they are permitted to fall between the guide rails 16, 18 so that when they arrive in the inverted position the mouths of the bottles rest in tapered holes 66 cut in the cross bar 28 and the bottles are supported in the tapered holes in alignment with cleaning nozzles 70 during the cleaning operation. The cleaning nozzles 70 are supported in brackets 72 which are adjustably clamped to a supporting bar 74 extending across the front of the machine. The supportng bar 74 is supported at either end on brackets 76 secured to vertical rods 78 supported in bearings 80, 82, and arranged to be reciprocated vertically by a cam 84 on the cam shaft 48. The reciprocating connections include a collar 86 secured to the vertical rods 78 with which yoke levers 88 are arranged to engage. The yoke levers 88 are secured to a rocker shaft 90 which is rocked by the cam 84 cooperating with a roll 92, mounted upon a lever 94 also secured to the shaft 90. A spring 96 serves to hold the roll 92 against its cam 84. Through the connections described, the air nozzles 70 are raised from the position shown in Fig. 6 up to a position shown in Fig. 2.

During the operation of the machine when the air nozzles 70 have been inserted into the inverted bottles, as shown in Fig. 2, provision is made for releasing a stream of air into the bottles and for this purpose a valve 100 is provided, see Figs. 3 and 4, connected to a source of compressed air (not shown). The valve comprises a housing 102 provided with an inlet 104 and a cap member 106 provided with an outlet 108. A rotary disk 110 yieldably pressed against the cap member 106 by a spring 112 is provided with an opening 114 and the rotary disk is arranged to be rocked to position the opening in alignment with the outlet 108 when the bottle is to be cleaned, and to rock the opening away from the outlet when the cleaning nozzle is withdrawn. The rotary disk is arranged to be rocked by a cam 116 mounted on the cam shaft 48 through cooperation with a cam roll 118 provided on a lever 120 which is pivoted on a cross shaft 122. A connecting rod 124 connects the lever 120 to a lever 126 keyed to a rocker shaft 128 which is journaled in the cap member 106 and is connected to the rotary disk 110 by a tongue and groove connection 130 as illustrated. Each cleaning nozzle 70 is connected to the valve 100 through a manifold 132 by a flexible hose 134 and an adapter 135. The manifold 132 is connected to the outlet 108 of the valve 100 by a flexible hose 136. A spring 138 normally holds the valve in its inoperative position. The discharge of air into the bottle causes the foreign particles to be blown out downwardly and outwardly into a dust pan 140 supported beneath the cleaning mechanism. Any usual or preferred means may be employed for removing the accumulated dust in the dust pan 140, such as by connections to a dust bag, not shown, or the dust may be removed through a door 141 provided in the side of the pan.

Provision is made for manually adjusting the position of the dust pan 140 and the cleaning mechanism to accommodate different heights of bottles and, as herein shown, the dust pan is supported in bearings 146, 148 secured to the machine frame. One of the supporting rods 142 is provided at its upper end with a bevel gear 150, which is arranged to be rotated by a bevel gear 152 upon rotation of the handle 154. The vertical rods 142, 143, are connected together at their lower ends by a chain 156 which runs over sprockets 158, 160 secured to the lower ends of the vertical rods. The supporting bar 74 carried by the reciprocating rods 78, see Fig. 2, is arranged to be adjusted through provision of sprockets 162, 164 connected by a chain 165, each reciprocating rod 78 being connected to its respective vertical rod 142 or 143. A bushing 168 provided in each upper bearing 80 for the movable rod 78 is arranged to permit rotation of the bushing and the vertical rods 78 to thereby change the position of the cleaning mechanism through cooperation of the screw threads 79 with the bracket 76, and at the same time permit the rods 78 to be vertically reciprocated.

As shown in detail in Fig. 7, each cleaning nozzle 70 is supported in a bracket 72 which is clamped to the supporting bar by a cap 73. The cleaning nozzle is preferably secured in the bracket 72 by a spring pressed friction plug 170 so that in the event that any obstruction to the entrance of the nozzle into the bottle is encountered, the nozzle will be permitted to slide through the hole in the bracket and breakage of the nozzle will thus be prevented.

As hereinbefore stated, the stop members 12, 14 and 20 are arranged to automatically control the release of the bottles into and out of the pockets 15 and, as herein shown, the stop members 12, 20 are operated simultaneously from a common cam 170. The cam 170 mounted on the cam shaft 48 cooperates with a cam lever 172 secured to a rocker shaft 174 and provided with a cam roller 176. The stop member 20 is secured to a short shaft 178 which is mounted in a bearing 180 secured to the side rail 62. The short shaft 178 is provided with a lever 182 which is connected by a rod 184 to a lever 186 secured to the rocker shaft 174. A spring 188 connected to the lever 186 tends to hold the roller 176 against its cam 170. The rocker shaft 174 supported in bearings 190, 192 in the machine frame is provided with a second lever 194 fixed at its outer end, which is connected to the stop member 12, by a rod 196 and a lever 198 secured to a short shaft 200 upon which the stop member 12 is also secured. Because the stop member 20 is flush with the rotary guide rail 24, a cutout 25 is provided in the guide rail to permit movement of the stop member out of the path of the bottles. A second cam 202 secured at the outer end of the cam shaft 48 is arranged to operate the stop member 14 through connections including a bell crank loosely mounted upon the rocker shaft 174, one arm 203 of which is provided with a cam roll 204 cooperating with the cam 202. The second arm 206 of

the bell crank is connected by a rod 208 to a lever 210 secured to a rocker shaft 212 upon which the stop member 14 is secured.

As herein illustrated, provision is made for continuously driving the conveyor belt 10 during the operation of the machine. To this end, a sprocket 220 secured to the driving shaft 54 of the machine is connected to a sprocket 222 by a chain 225. The sprocket 222 is fast on one end of an intermediate shaft 224, supported longitudinally of the conveyor, in bearings 226. The other end of the shaft 224 is provided with a bevel gear 228 which meshes with a bevel gear 230, fast on the conveyor pulley shaft 232. Thus the conveyor belt is driven continuously to advance the bottles along the conveyor, and the feed of the bottles is controlled by the stops 12, 20 and 14 as above described.

It will be noted that two sets of bottles will be cleaned during each complete cycle of operation of the machine. The cam 46 is so designed that for each revolution of the cam shaft 48, the pockets 15 are rocked twice; once clockwise, and once counterclockwise, so that at the end of the cycle the original set of bottles is returned to the conveyor 10 and the second set of bottles is cleaned and ready to be returned upon the start of a new cycle of operation.

Provision is made for stopping the machine when the supply of bottles being fed in on the conveyor runs out and as herein shown a safety finger 240 is provided which is normally urged into the path of the bottles by a spring 242. The safety finger is mounted on a vertical stud 244 mounted on trunnion screws 245 supported in a bracket 246 mounted upon a bar 248 which is supported from the side rail 62 of the conveyor. Also mounted upon the vertical stud 244 is a collar 247 provided with a cut-out portion 251, which is arranged to cooperate with a latch 249 mounted upon a rocker shaft 250. The rocker shaft 250 mounted in bearings 252, 254 is provided at one end with a mercury switch 256. Also mounted on the rocker shaft is an arm 258 which is arranged to rock the shaft clockwise, viewing Fig. 10, by its own weight, when permitted to do so by the releasing of the latch 249. In operation when the supply of bottles is depleted the safety finger 240, normally resting against the sides of the incoming bottles, is urged into the position shown by the dotted lines in Fig. 9, thereby releasing the latch 249 from its normal position against the bottom of the collar 247 into the cut-out portion 251 and permitting the rocker shaft 250 to be rocked to thereby open the circuit at the mercury switch 256. As diagrammatically illustrated in Fig. 17, the mercury switch 256 is connected in the circuit to the motor 257 for driving the machine.

Provision is made for rendering the safety finger 240 inoperative during the time when the stop 12 is actuated to release the group of bottles, positioned between the stops 12 and 14, into the machine. For this purpose connections are made to the lever 198 which operates the stop 12, and as herein shown, a follower 260 loosely mounted on the shaft 200 is yieldingly urged against a raised portion 199 of the arm 198 and adapted to engage the extended end of a lever 262 fixed to the end of the rocker shaft 250. When the stop lever 12 is operated to release a new set of bottles into the machine, the follower 260 is actuated to retain the rocker shaft in its normal position to prevent the machine from being stopped when the new set of bottles is being delivered into the machine. During this time, the safety finger 240 moves into the position shown in dotted lines in Fig. 9. As soon as the stop member 14 is withdrawn to permit the new set of bottles to be introduced and the stop member 12 is again positioned in front of the incoming bottles, the rocker shaft is again free to be acted upon by the safety finger 240 and latch 249. As shown in Fig. 9, the follower member is yieldingly urged against the raised portion 199 of the stop lever 198 by a coil spring 261, one end of which is secured in a collar 263, fixed to the end of the rocker shaft 200 and the other end in the follower member 260. The lever 262 is limited in its movement by a stop screw 264 mounted in the bracket 266 and the follower member 260 is held against the stop 264 while the rocker lever 198 continues in its movement. Provision is also made for limiting the movement of the latch collar 247, and as herein shown, a stop screw 268, secured in the bracket 270 rests against a cut-out portion of the collar 247.

In operation when the supply of bottles is depleted the safety finger 240 falls into the path of the bottles and releases the latch 249 thereby permitting the rocker shaft to rock, and as herein shown, see Fig. 11, the arm 258 will be locked in its lowered position by a latch member 272 loosely supported on a stud 274 secured to the side rail 60 of the conveyor so that the machine will not be permitted to start until the supply of bottles is replenished and the latch 272 is manually removed to free the arm 258.

It will be noted that provision is made in the illustrated machine for adjusting the various mechanisms to accommodate different sizes and quantities of bottles. Thus, on the incoming end of the conveyor 10, the stop 12 is fixed but the bottle separating finger 14 may be moved longitudinally along the shaft 212 and clamped into its adjusted position. Likewise, the detecting finger 240 and its associated mechanism may be adjustably clamped anywhere along the bar 248 to accommodate the position of the last bottle in the group. As hereinbefore stated, the air nozzles 70 are adjustably clamped to the supporting bar 74 and may be positioned along the bar into alignment with the bottles.

Briefly, the operation of the machine may be summarized as follows: A supply of bottles is fed into the machine on the conveyor 10 up against a stop 12 and when the stop 12 is withdrawn a group of bottles corresponding to the number of bottles to be cleaned is released into the pocket 15. The pocket 15 is rotated 180 degrees, inverting the set of bottles and placing them in cleaning position, and at the same time a second pocket is brought up into position to return a previously cleaned set of bottles to the conveyor and to receive a new set of bottles to be cleaned. The cleaning nozzles 70 are now raised up into the bottles and a stream of air is injected to pneumatically clean the bottles, whereupon the nozzles are withdrawn and the pockets are again rotated 180 degrees to bring a new set of bottles into cleaning position and to bring the cleaned bottles up on the conveyor again. The stops 20, 12 are now actuated to release the cleaned set of bottles and to permit the new set of bottles to be brought into the pockets 15 to be cleaned during the next half cycle of operation of the machine. During the succeeding cycles two sets of bottles are cleaned for each complete revolution of the cam 46.

While the preferred embodiment of the inven-

tion has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a container cleaning machine, in combination, a conveyor for transporting the containers into and from the machine in an upright and substantially vertical position, container cleaning means disposed beneath the conveyor, a stationary drum disposed between said conveyor and said container cleaning means, and means for transferring the containers around said drum from an upright position on the conveyor to an inverted position beneath the conveyor and in operative relation to the container cleaning means.

2. A receptacle cleaning machine, having in combination, conveyor means for conveying receptacles into and from the machine, a plurality of nozzles, rotary means for moving a plurality of receptacles from said conveyor and presenting them in operative relation to said nozzles, and means for separating the incoming receptacles into groups and for releasing said groups into the machine in timed relation to the operation of the rotary moving means and of the cleaning nozzles, said separating means comprising a stop finger adapted to hold back a line of receptacles, a second stop finger adapted to enter between two adjacent receptacles in the line to form a group and actuating means operatively connected to said stop fingers for releasing the group into said rotary moving means and for forming another group, and means for simultaneously releasing the previous group of cleaned receptacles from said rotary moving means.

3. A receptacle cleaning machine, having in combination, conveyor means for conveying receptacles into and from the machine in an upright and substantially vertical position, a plurality of cleaning nozzles, rotary means for moving a plurality of receptacles from said conveyor and presenting them in operative relation to said cleaning nozzles, said conveyor means comprising an endless belt separate from and independent of said rotary means, means for separating the incoming receptacles into groups and for releasing said groups into the machine in timed relation to the operation of the rotary moving means and the cleaning nozzles, and detecting means for detecting the absence of a receptacle from the group, said detecting means being operative to stop the machine when the absence of a bottle is detected.

4. In a receptacle cleaning machine, in combination, a traveling conveyer extending continuously across said machine for conveying a line of receptacles in an upright position into and away from the machine, a plurality of cleaning nozzles disposed below the conveyer, means for simultaneously moving a plurality of receptacles from their upright position on the conveyer transversely of the path of said conveyer and downwardly and into an inverted position, said means including a member for transversely sliding said plurality of receptacles from said conveyer, means for thereafter causing introduction of the cleaning nozzles into the inverted receptacles, means for pneumatically cleaning the inverted receptacles, and means for returning the cleaned receptacles from their inverted to their upright positions upon the conveyer to be conveyed thereby from the machine.

5. In a receptacle cleaning machine, in combination, traveling conveying means extending continuously across said machine for conveying receptacles in an upright position into and away from the machine, pneumatically operating cleaning means, receptacle moving means for simultaneously moving a group of receptacles from their position on the conveying means in a direction transverse to the path of said conveying means into a different position and in operative relation to said pneumatic cleaning means, said receptacle moving means including a member for transversely sliding said group of receptacles from said conveying means, and means for returning the group of cleaned receptacles into upright position upon said conveying means while a succeeding group of receptacles is being moved into cleaning position.

6. In a receptacle cleaning machine, in combination, receptacle cleaning means, conveying means arranged to convey receptacles in an upright position into and away from the machine, and receptacle moving means for simultaneously moving a plurality of receptacles from said conveying means into operative relation to said cleaning means, and for subsequently returning the cleaned receptacles to said conveying means in an upright position, said receptacle moving means comprising unobstructed, open-ended pockets generally U-shaped in vertical, transverse cross-section, and stationary means arranged to form a closure for the ends of said pockets when the receptacle moving means has moved the receptacles from their normal upright position, said conveying means operating to feed containers into the machine and to discharge the same at substantially the same level.

7. In a receptacle cleaning machine, in combination, a conveyer upon which receptacles are moved in an upright position into the machine, a stop member disposed transversely of said conveyer to position a group of receptacles, pneumatic cleaning means disposed at a lower level and mounted to be capable of adjustment into predetermined relation to said stop member whereby said pneumatic cleaning means may be aligned with receptacles of varying size, and receptacle moving means for simultaneously moving a plurality of containers from said conveyer into an inverted position in operative relation to said pneumatic cleaning means, and for simultaneously returning a plurality of cleaned receptacles to the conveyer.

8. A receptacle cleaning machine having, in combination, conveying means for conveying receptacles in an upright position to and away from the machine, a plurality of cleaning nozzles, rotary means for simultaneously moving a plurality of receptacles into operative position with relation to said cleaning nozzles, said rotary means comprising a plurality of radially extending receptacle supporting pockets circumferentially spaced apart, means for imparting intermittent rotary movement thereto, and a stationary supporting drum on the periphery of which the bottoms of said receptacles are engaged and supported during at least a part of the rotary movement of the receptacles and pockets.

9. A receptacle cleaning machine having, in combination, conveying means for conveying receptacles in an upright position into and from the machine, a plurality of cleaning nozzles, rotary means for simultaneously moving a plurality of receptacles from their position upon said conveying means into an inverted position in oper-

ative relation to said cleaning nozzles, said rotary means comprising a plurality of pockets spaced apart for supporting different groups of receptacles, a stationary drum over which the receptacles ride during the rotary movement of the pockets and receptacles, and means for alternately rotating the pockets to present uncleaned receptacles into operative relation to said cleaning nozzles and to return previously cleaned receptacles to said conveying means to be conveyed from the machine, and means for supporting in alignment said receptacles with respect to said cleaning nozzles when the receptacles are in their inverted positions.

10. In a receptacle cleaning machine, in combination, continuously traveling conveyer means for positively feeding a plurality of receptacles in an upright position into the machine, a plurality of circumferentially spaced open-bottom members for receiving and moving groups of receptacles fed by said conveyer means from an upright to an inverted position and back to the upright position, said receptacle moving members being positioned above the plane of said traveling conveying means when being loaded and unloaded, mens for controlling the movement of the receptacles by the traveling conveyer into said receptacle moving members, a plurality of cleaning nozzles disposed below said conveyer, and means for intermittently moving said receptacle moving members to move a group of receptacles from an upright to an inverted cleaning position in one continuous movement and for simultaneously returning into operative position with respect to the conveyer means a previously cleaned group of receptacles, said control means operating to prevent conveyance of uncleaned receptacles by said continuously traveling conveyer means until the previously cleaned receptacles have been restored to operative position with respect to said conveyer means.

11. In a receptacle cleaning machine, in combination, traveling conveying means for conveying receptacles in an upright position to and from the machine, a rotatable member having diametrically extending pockets each provided with an open bottom and open ends adapted to normally be disposed in a vertical plane, said conveying means being arranged to feed receptacles into an open end of the uppermost pocket in an upright position and including a substantially horizontal run lying in a horizontal plane below the lowermost portion of said uppermost pocket, means for rotating said receptacle moving means for simultaneously moving a plurality of receptacles from an upright position in the path of travel of said conveying means into an inverted position in one continuous movement and for thereafter returning said receptacles from said inverted position to an upright position in another continuous movement, and means for pneumatically cleaning the receptacles while they are in the inverted position.

12. In a receptacle cleaning machine, in combination, endless conveying means for conveying receptacles in an upright position to and from the machine, receptacle moving means comprising a rotatable, normally vertically disposed generally rectangular frame having transverse unobstructed pockets formed at the opposite ends thereof, each of said pockets being of a transverse length sufficient to receive a plurality of receptacles therein and extending parallel with the axis of rotation of said frame, said conveying means being arranged to supply a plurality of receptacles successively to said pockets and being disposed in a plane below the level of that of the lowermost portion of the upper of said pockets, means for rotating said frame and pockets for simultaneously moving a plurality of receptacles from an upright position into an inverted position in one continuous movement and from an inverted position to an upright position in another continuous movement, and means for pneumatically cleaning the receptacles while they are in the inverted position.

13. In a receptacle cleaning machine, in combination, rotatable receptacle supporting means for simultaneously moving a plurality of receptacles about a substantially horizontal axis from an upright position into an inverted position, conveying means comprising a belt for supplying unclean receptacles to and discharging cleaned receptacles from said receptacle supporting means in an upright position, said belt extending across said rotatable receptacle supporting means in a direction substantially parallel to the axis of rotation of said receptacle supporting means, means for effecting rotary movement of said receptacle supporting means to remove the upright receptacles from said belt and to move the same from an upright to an inverted position in one continuous movement, means for pneumatically cleaning the receptacles while in their inverted position, and means for thereafter effecting a return of the cleaned receptacles to an upright position upon said belt in one continuous movement.

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