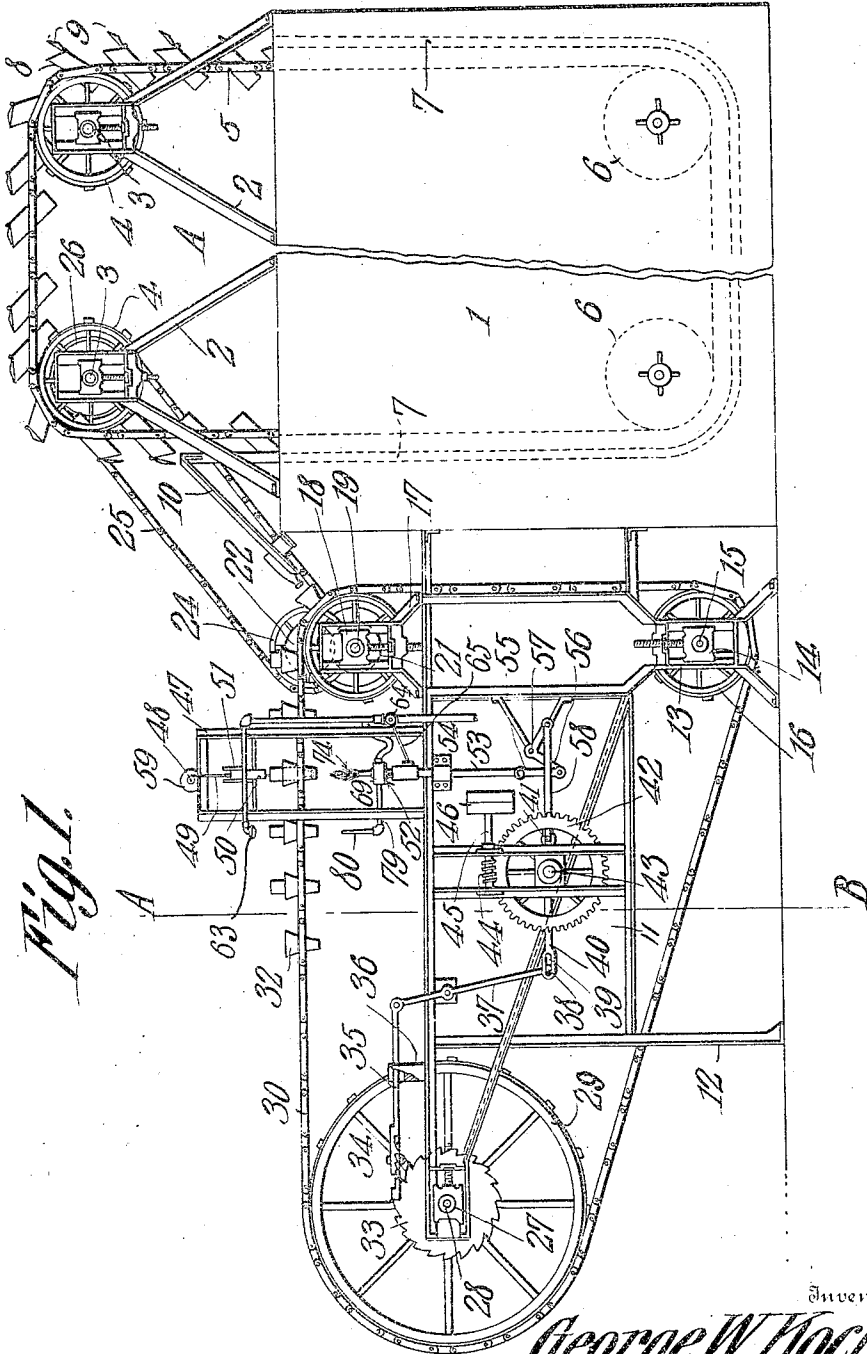


G. W. KOCH.
BOTTLE WASHING MACHINE.
APPLICATION FILED APR. 2, 1903.

935,261.

Patented Sept. 28, 1909.

6 SHEETS—SHEET 1.



Witnesses

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354

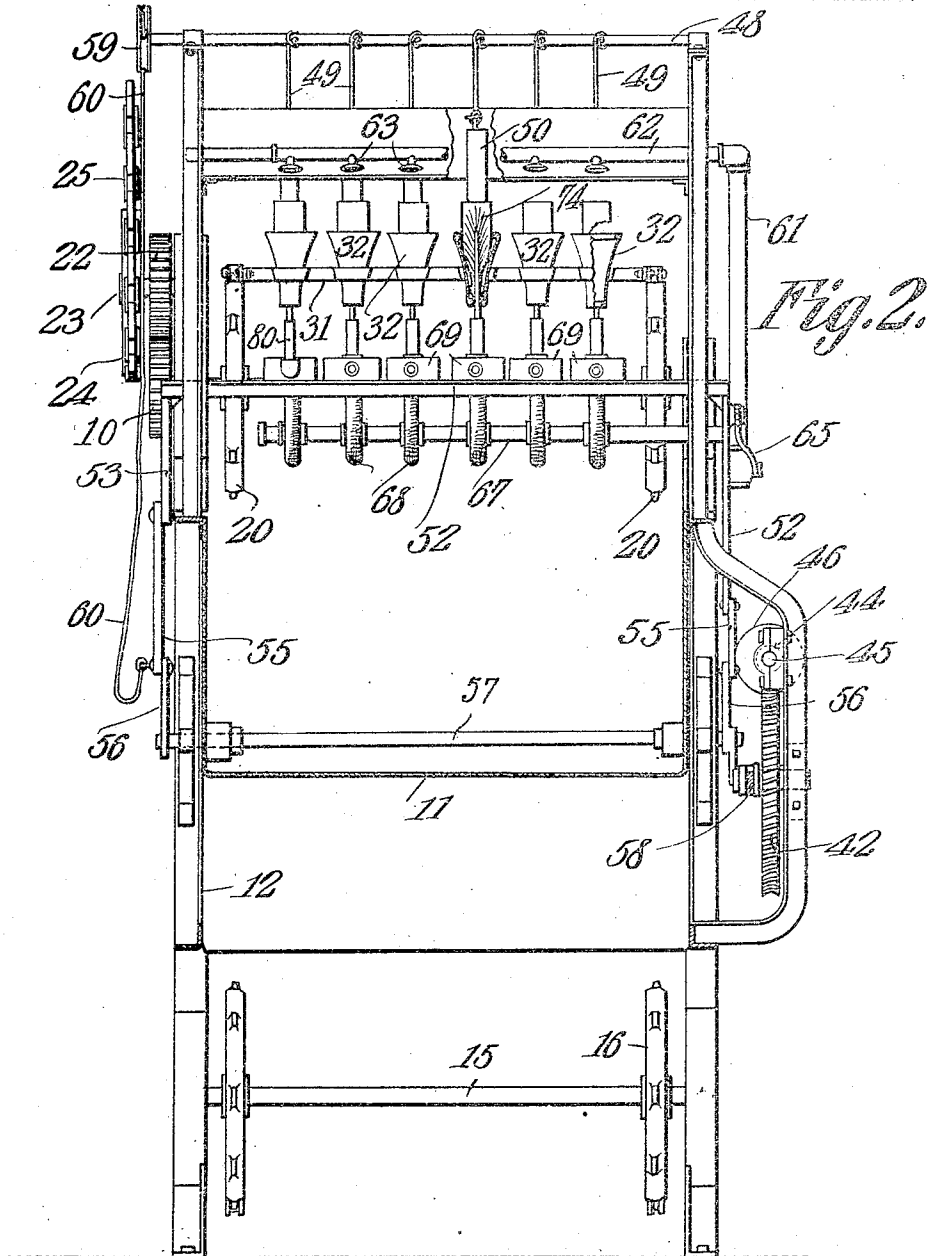
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6 SHEETS—SHEET 2.



Witnesses

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935,261.

This figure shows two views of a mechanical device. The top view, labeled "Fig. 3.", is a plan view of a circular component with internal parts numbered 19, 20, 30, 32, 68, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200. The bottom view, labeled "Fig. 4.", is a side elevation showing the profile of the device with various components numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Inventor

George M. Koch

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Witnesses
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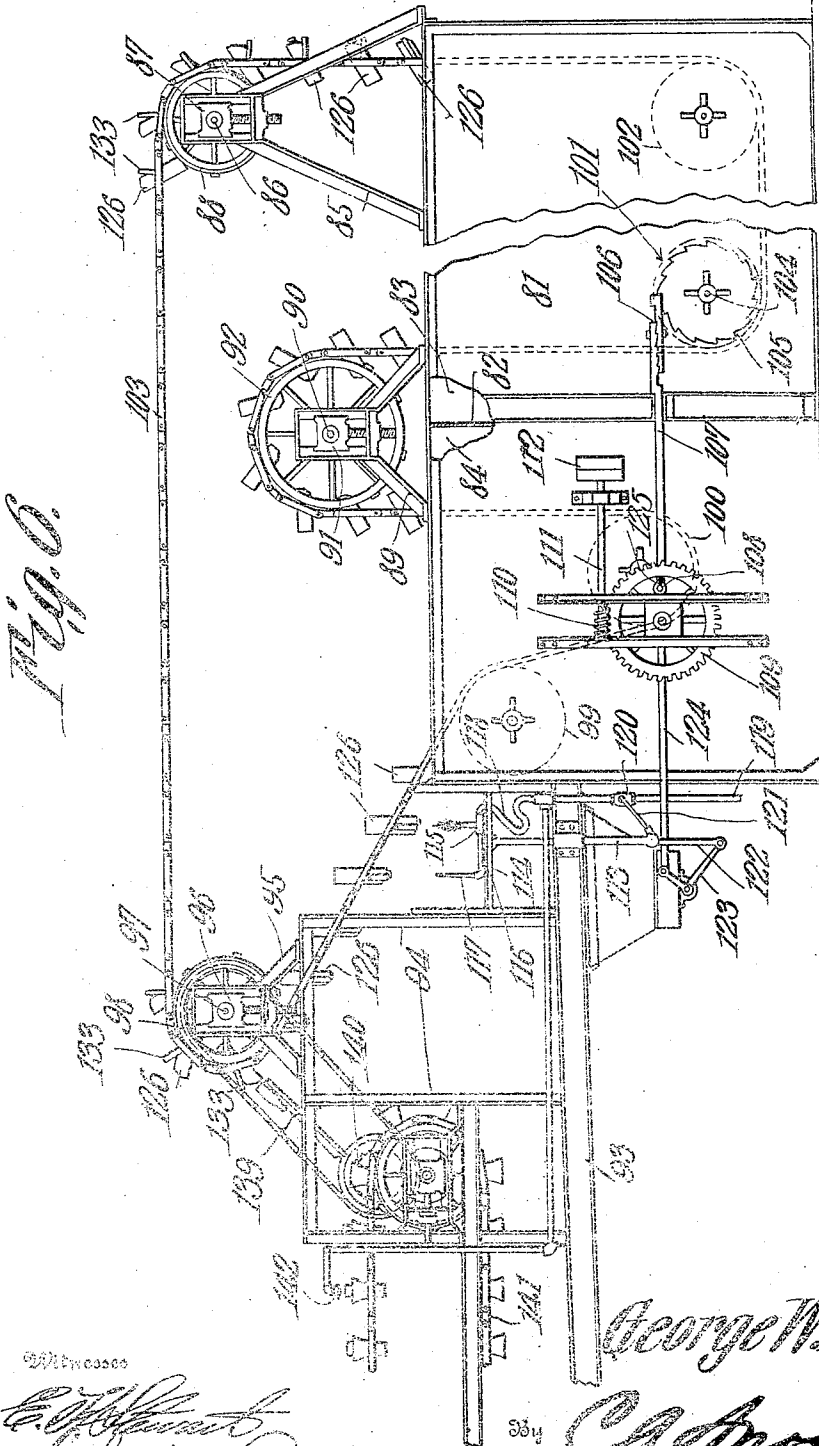
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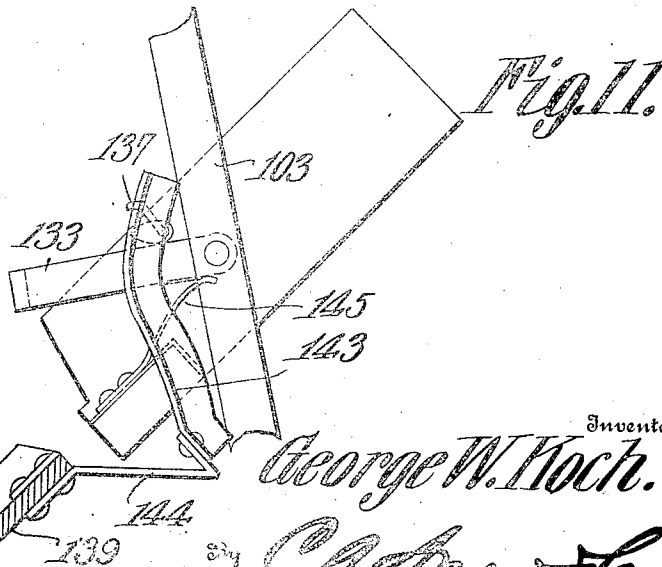
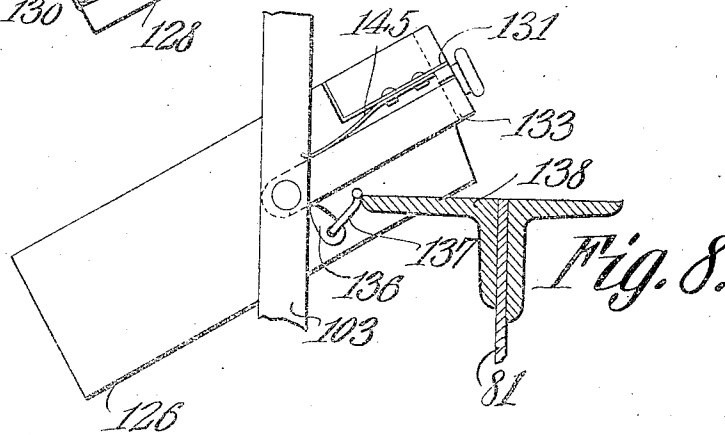
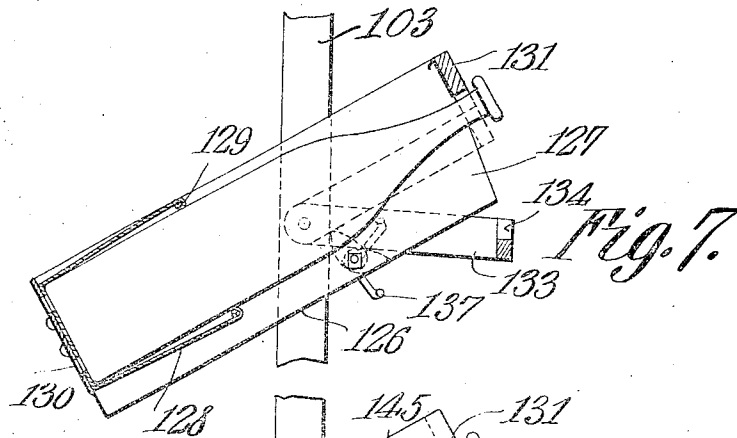
6 SHEETS—SHEET 4.



935,261.

Patented Sept. 28, 1909.

6 SHEETS—SHEET 5.



Witnesses

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BOTTLE WASHING MACHINE.
APPLICATION FILED APR. 2, 1908.

935,261.

Patented Sept. 28, 1909.

6 SHEETS—SHEET 6.

Fig. 13.

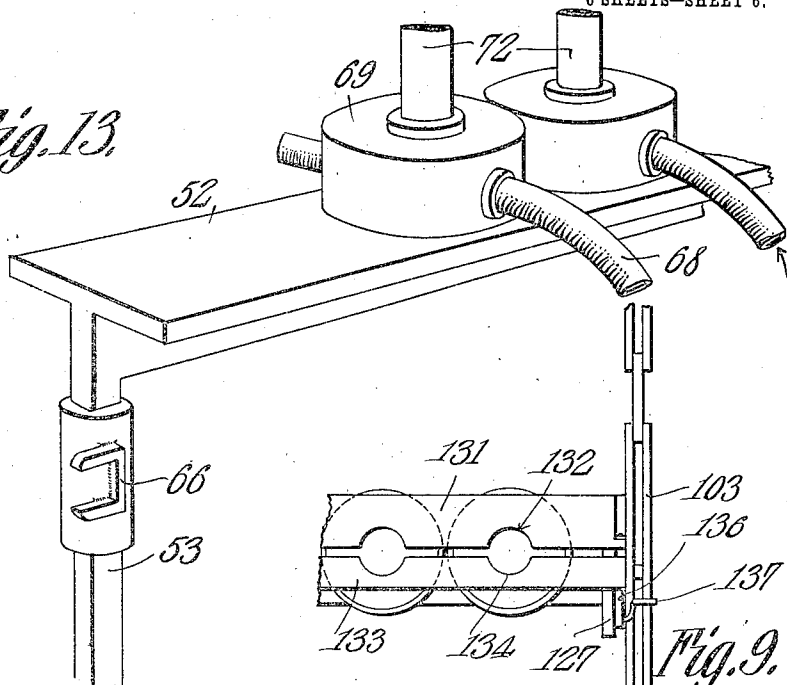


Fig. 9.

Fig. 10.

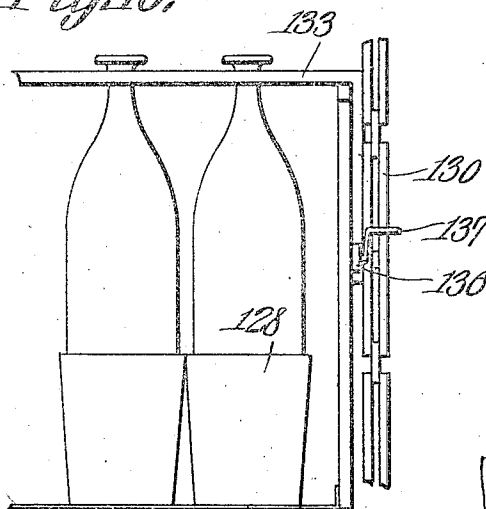
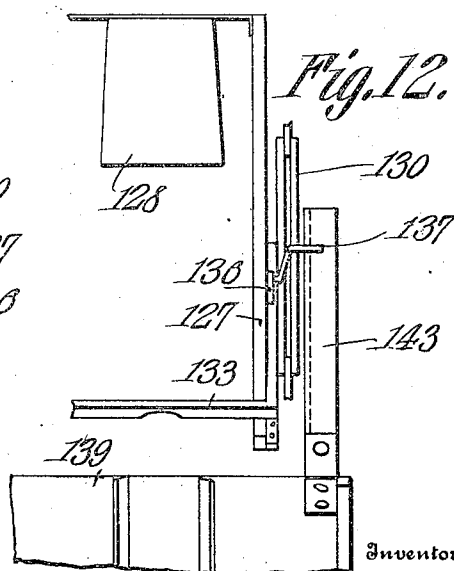


Fig. 12.



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UNITED STATES PATENT OFFICE.

GEORGE W. KOCH, OF PHILADELPHIA, PENNSYLVANIA.

BOTTLE-WASHING MACHINE.

935,261.

Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed April 2, 1908. Serial No. 424,828.

To all whom it may concern:

Be it known that I, GEORGE W. KOCH, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Bottle-Washing Machine, of which the following is a specification.

This invention relates to machines for washing bottles and more particularly to machines whereby the bottles after being conveyed from a solution tank, can be thoroughly cleansed inside and outside without the necessity of dropping them into tanks of water.

Another object is to provide novel means for directing a whirling spray into the bottles as they are brought successively into position above said mechanism.

A further object is to so arrange the various parts of the machine that a bottle having once been placed in the machine will be successively carried through a solution tank and a clear water tank and finally to the rinsing mechanism, after which said bottle is conveyed above a drain tank to the point of use, all of said mechanisms being operated intermittently from a common source of power.

With these and other objects in view the invention consists of certain novel features of construction and combinations of parts which will be hereinafter more fully described and pointed out in the claims.

In the accompanying drawings is shown the preferred form of the invention.

In said drawings: Figure 1 is a side elevation of the bottle washing mechanism, the rinsing and draining apparatus being disclosed as an attachment for a bottle soaker of ordinary construction. Fig. 2 is an enlarged section on line A—B, Fig. 1. Fig. 3 is an enlarged side elevation of the rinsing mechanism. Fig. 4 is a horizontal section through the motor of the rinsing mechanism, the hub being shown partly in plan. Fig. 5 is a central vertical section thereof. Fig. 6 is a side elevation showing the rinsing mechanism as a part of a soaker of special construction. Fig. 7 is a section through one of the racks of the soaker and showing the positions of the parts when a bottle is first placed within the rack. Fig. 8 is a side elevation of a rack and showing the manner of locking a bottle therein as it passes into a solution tank. Fig. 9 is an end view of a portion of the rack and showing

the lock in closed position. Fig. 10 is a face view of a portion of the rack. Fig. 11 is an elevation of a rack and the means employed for unlocking the same to release the bottle or bottles therein. Fig. 12 is an elevation of the parts shown in Fig. 11. Fig. 13 is a perspective view of a portion of the head and the parts connected thereto.

As heretofore stated, the present invention is designed for use either as an attachment for bottle soakers already on the market or can be embodied in a bottle soaker of special form.

In Fig. 1 A designates a bottle soaker of a well known type having a solution tank above which are arranged standards 2 carrying the shafts 3 on which are mounted sprockets 4 carrying endless chains 5, which chains extend downward into the tank and under idler sprockets 6. That portion of the chain within the tank is paralleled by rails 7 for the purpose hereinafter set forth.

Rigidly secured to the chains at regular intervals are racks 8 each of which is designed to hold a desired number of bottles, the necks of which project beyond the outer ends of the racks, there being hingedly mounted retaining strips 9 upon the racks for holding the bottles in place therein. These strips are so located that when the racks are drawn downward into the tank the strips will bear upon the rails 7 and be held in closed positions thereby. As shown in Fig. 1 the rails 7 extend upwardly above the tank adjacent one end and to an inclined board or chute 10 so that the closures or retaining strips 9 will be held shut until the racks are brought into position above the upper end of board 10, whereupon the bottles will, by their own weight, swing the retaining strips open so that the bottles will be free to slide downward upon the board 10.

The mechanism above described does not constitute any part of the present invention but merely forms part of one form of bottle soaker now in use. The attachment constituting the present invention consists of a drain tank 11 supported by a suitable frame 12 and mounted in a hanger 13 depending from this frame are adjustable bearing blocks 14 carrying a shaft 15 on which are secured sprockets 16. Standards 17 are arranged upon the frame 12 above the hangers 13 and have bearing blocks 18 adjustably mounted therein and supporting a shaft 19. On this shaft are secured sprockets 20 and a

gear 21. This gear meshes with another gear 22 secured to a stud shaft 23 on which is fastened a sprocket 24 designed to transmit motion through a chain 25 to a sprocket 26 on shaft 3 heretofore referred to. Sprocket 24 is located beyond one side of the frame 12 as indicated particularly in Fig. 2.

The forward end of frame 12 is provided with bearing boxes 27 adjustable in any suitable manner longitudinally of the machine and carrying a shaft 28 on which are secured sprocket wheels 29. Mounted on these wheels and the sprockets 16 and 20 are endless chains 30 constituting a conveyer and connected at regular intervals by cross bars 31 each carrying a series of inverted substantially frusto-conical receiving sleeves 32 open at their upper and lower ends and spaced apart laterally distances equal to the distances between the bottles within the racks 8. These rows of series of sleeves are designed to assume positions at the lower end of board 10 so that the bottles when released from the racks will slide down upon the board 10 with their necks lowermost and will enter the sleeves 32 in the paths thereof.

Secured to shaft 28 is a ratchet wheel 33 designed to be actuated by a pawl 34 adjustably connected in any suitable manner to an arm 35 which may be slidably mounted on a suitable supporting block 36 or other structure. This arm 35 is pivotally connected to one end of a lever 37 fulcrumed at an intermediate point upon the frame 12 and having a wrist pin 38 at its other end movably mounted within a slot 39 formed longitudinally within pitman 40. This pitman is connected to a wrist pin 41 extending from one face of a worm wheel 42 which is journaled upon a stud shaft 43 extending from the frame 12. Wheel 42 is driven preferably by means of a worm 44 upon a shaft 45 having pulleys 46 or other suitable means whereby motion may be received from a belt driven by a suitable motor, not shown.

With the mechanism herein described it will be seen that during each complete rotation of the worm wheel 42 the pawl 34 will operate to turn ratchet wheel 33 one or more teeth, according to the adjustment of the pawl 34 relative to the arm 35. Obviously the farther the pawl 34 is from the pivot of arm 37 the sooner it will engage a tooth on the ratchet wheel and the greater will be the movement of said ratchet wheel when the pawl is reciprocated. This intermittent motion of the ratchet wheel will result in a corresponding movement of the chains 30 and sleeves 32 and also of the chains 25 and 5 and of the racks 8. The parts are so spaced and timed that one set of sleeves 32 will assume a position at the lower end of the board 10 upon the completion of each movement of chains 30 and at the same time one rack 8 will assume a position at the up-

per end of board 10 so that the bottles contained therein will be free to move downward by gravity from the rack and along the board and thence into the sleeves 32 in the paths thereof.

Extending upward from the frame 12 at opposite sides of the conveyer formed by chains 30 and bars 31 are standards 47 on which is journaled a shaft 48 having cords or light chains 49 secured thereto and designed to be wound thereon and each of which has a weight 50 fastened to it and mounted between guide plates 51. These weights are disposed directly above the path of the sleeves 32 and one set of sleeves is designed to assume a position below the weights upon the completion of each movement of the mechanism.

A cross bar or head 52 is arranged below the upper ply of conveyer 30 and in vertical alinement with the weights 50 and this bar is supported at its ends by side bars 53 mounted in guides 54 and connected at their lower ends to links 55 which are in turn attached to bell crank levers 56. Both of these bell crank levers are secured to a transverse shaft 57 and one of the levers is connected by means of a pitman 58 with the wrist pin 41 hereinbefore referred to. A pulley 59 is secured to one end of shaft 48 and secured thereto and designed to be wound thereon is a cord 60 extending downward and secured to one of the bell crank levers 56.

A supply pipe 61 extends upwardly adjacent one of the standards 47 and opens into a distributing pipe 62 which connects the standards 47 and extends transversely above conveyer 30. This distributing pipe has a series of downwardly extending spraying devices 63 one of which is located directly in front of each weight 50 and at a distance therefrom equal to the distance between any two adjoining series of sleeves 32. A valve 64 is located within pipe 61 and the stem 65 thereof engages an ear 66 extending from one of the slides 53 and the parts are so related that during the completion of the upstroke of the slide 53 the valve is opened, while after the first portion of the downstroke of said slide the valve is closed. In Fig. 3 the position of the stem when lowered has been indicated by dotted lines.

Extending horizontally from pipe 61 at a point above valve 64 is a distributing pipe 67 from which extends a series of flexible tubes 68. Each tube opens into one of a series of casings 69 secured upon the bar 52 and these casings are equal in number to the number of sleeves 32 in each series. Each casing 69 has a hollow hub 70 journaled therein and provided with radial blades or wings 71 against which is directed the water which enters the casing through tube 68. Hub 70 has an upstanding pipe 72 which rotates therewith and openings 73 are formed

in the hub and between blades 71 so that a portion of the water discharged into the casing 69 will pass into the hub 70 and thence upwardly into pipe 72. An elongated cylindrical brush 74 is arranged at the upper end of the pipe 72 and has a tubular core 75 provided with guide openings 76 through which a portion of the water which is discharged into pipe 72, is expelled among the bristles of the brush. An opening 77 is formed at the end of the tube 75 so that a jet of water can be directed longitudinally from said end. An outlet opening 78 is formed in casing 69 and a pipe 79 extends from this opening and forwardly of the machine, said pipe terminating in an upstanding nozzle 80 arranged below and in vertical alinement with one of the spraying devices 63. One of these casings 69 and the mechanism herein described in relation thereto is located below each weight 50.

From the foregoing description it will be seen that during the upstroke of the slides 53 the brush 74 will be brought into position within the series of sleeves 32 thereabove and immediately subsequent to this positioning of the parts and just prior to the completion of the upward movement of the brushes, the valve 64 will be opened and water will rush from the supply pipe 61 through the tubes 68 to the casing 69. The force of the water will be sufficient to rotate the blades 71 and the hubs 70 so that the pipes 72 will be caused to rapidly revolve. The brushes will of course turn with the pipes. At the same time a portion of the water will escape through the openings 73 and into pipe 72 from which it will be discharged outwardly in minute jets through the openings 76 and 77. That portion of the water which is utilized for propelling the blades 71 will escape through pipes 79 to nozzles 80 by which it will be directed upwardly into the next adjoining series of sleeves 32 as will be clearly apparent by referring to Figs. 1 and 3 of the drawings. While this operation of the parts is taking place some of the water will pass upwardly and be distributed to the various spraying devices 63 which will operate to direct the water downwardly onto the inverted bottles contained within the series of sleeves 32 adjoining those beneath the weights 50.

It is to be understood that when the cross bar or head 51 is in lowered position the cord or chain 60 is held taut by the lever to which it is attached and when it is in this position it is unwound from the pulley or spool 59 while the cords or chains 49 are wound upon the shaft 48. The weights 50 are therefore held raised out of the paths of the bottles contained in sleeves 32. When wheel 42 is rotated by means of worm 44 the pitmen 40 and 58 are slowly operated. When the parts are in positions shown in

Fig. 1 the rotation of wheel 42 will cause pitman 40 to move to the left withdrawing the pawl 34 from the ratchet wheel 33 and thus leaving the chains 30 at rest. During this withdrawal of the pawl the pitman 58 is actuating bell crank levers 56 so as to push upwardly upon the slides 53 and raise the cross bar or head 52. This will result in the brushes 74 and the nozzles 80 being inserted into the bottles contained in two adjoining series of sleeves 32 and just prior to the upward movement of the brushes and nozzles, and valve 64 will be opened as hereinbefore described and the water will rush to the various outlets and rinse the bottles both inside and outside as will be apparent. Importance is attached to the fact that the same current of water operates to rotate the brushes and to spray through the brush and into the bottle. As soon as the bell crank levers 56 begin their upward movement for raising the cross bar or head 52 the cord 60 becomes slack and the weights 50 pull downward on the cords 49 which thus unwind from the shaft 48 and assume positions upon the bottoms of the inverted bottles thereunder. Displacement of the bottles during the insertion of the brushes thereinto is thus prevented.

When wheel 42 begins the second half of its rotation the pitmen 40 and 58 operate to reverse the movements of levers 37 and 56 and the slot 39 is of such length that the brushes 74 and nozzles 80 will have been withdrawn from the bottles and the weights 50 raised therefrom, before the end wall of the slot strikes the wrist pin 38 so as to actuate lever 37 and cause pawl 34 to partly rotate the ratchet wheel 33. This partial rotation will be sufficient to move one set of bottles from under the weights 50 and into position under the spraying devices 63 while another set of bottles is brought into position under the weights. This intermittent motion will be transmitted through chain 25 to the rack carrying chains 5 and another rack will be brought into position above board 10 as soon as a new set of sleeves 32 assumes a position at the lower end of the board. It will thus be seen that bottles will be automatically carried through the tank 1 and discharged into the sleeves 32 and then conveyed through the rinsing apparatus and above the drain tank into which the water will be free to drop as the bottles pass to the end of the machine where they can be removed by the operator.

In Fig. 1 only a few sets of sleeves 32 have been shown but it is to be understood of course that these sets are to extend at regular intervals throughout the lengths of the chains 30.

Instead of constructing the rinsing mechanism as an attachment for a bottle soaker the same can be incorporated in a single ma-

chine with soaking mechanism, as illustrated in Figs. 6 to 12 inclusive. In the complete machine shown in these figures it is designed to rinse the insides of the bottles while they are in the racks which convey them through the solution tank. The intermediate operation of sliding the bottles from the racks to the holding sleeves before the rinsing operation is thus dispensed with.

By referring to the drawings in Fig. 6 it will be noted that the tank 81 is divided by a vertical partition 82 into two compartments 83 and 84 respectively, the first mentioned compartment being designed to hold a disinfecting and cleansing solution while the compartment 84 is designed to hold clear water. Standards 85 are arranged above the feed end of the tank and a shaft 86 is journaled upon them preferably in adjustable boxes 87. This shaft has sprockets 88 secured to it. Standards 89 extend upward from the middle portion of the tank and above the partition 82 and have a shaft 90 journaled preferably in boxes 91 adjustably mounted upon the standards. Sprockets 92 are secured to this shaft. A frame 93 extends from one end of the tank 81 and arranged thereon are uprights 94 suitably connected and supporting standards 95 in which are mounted adjustable boxes 96 constituting bearings for a shaft 97. This shaft has sprockets 98 secured to it. Idler sprockets 99 and 100 are disposed within the upper and lower portions of the compartment 84 and sprockets 101 and 102 are located in the lower portion of the compartment 83. Endless chains 103 are mounted on sprockets 88 and 98 and extend downward under the sprockets 101 and 102 and thence upwardly and over sprockets 92 from which they extend downward under the sprockets 100 and over the sprockets 99. It will thus be seen that during the movement of the chains in the direction of their lengths all portions thereof will be conveyed downward into the compartment 83 and thence over partition 82 and downwardly into the compartment 84 from which said chains will extend in an inclined plane upwardly to the sprockets 98. Sprockets 101 are secured to a shaft 104 to which is attached a ratchet wheel 105 designed to be engaged by a pawl 106 adjustably connected to an arm 107 which is in turn mounted upon a wrist pin 108 extending from a worm wheel 109. This worm wheel receives its motion from a worm 110 on a shaft 111 having pulleys 112 for receiving motion from a suitable motor through a belt not shown. This mechanism produces an intermittent movement of the chains 103.

Mounted in frame 93 are slides 113 only one of which has been shown but both are similar in construction to the slides 53 and are connected by a cross head 114 on which

is mounted a series of devices for producing a whirling spray such as heretofore described, one of said devices being indicated at 115 and shown provided with an outlet pipe 116 terminating in a nozzle 117. A flexible tube 118 extends from each of the devices 115 to a supply pipe 119, the valve 120 of which has a stem 121 designed to be actuated by the slide 113 in the same manner as is the valve stem 65 hereinbefore referred to. The slides 113 are connected by links 122 to levers 123 and one of these levers is connected by a pitman 124 with the wrist pin 108. The cross head 114 is mounted to reciprocate below those portions of the inclined chains 103 arranged between tank 81 and the uprights 94. In order that the lost motion produced by slotting the pitman 40 may be duplicated in this modified construction pitman 107 is preferably provided with a slot 125 in which the wrist pin 108 works.

In order that bottles may be supported in inverted positions while being operated upon by the rinsing mechanism it is necessary to provide means whereby these bottles can be locked within the racks containing them and automatically unlocked after the rinsing operation so that the bottles can be discharged either into a tank or onto a suitable conveyer. In Fig. 6 only a few racks 126 have been shown connected to the chains 103 but it is of course to be understood that these racks are to extend the full lengths of the chains and at regular intervals apart. The construction of each rack has been shown particularly in Figs. 7 to 10 inclusive. Each rack consists of an elongated rectangular frame 127 having a series of frusto-conical cups 128 secured therein upon the bottom thereof, the open end of each cup being provided with an inturned bead 129 designed to space an inserted bottle from the wall of the cup. Openings 130 are formed in the bottom of each cup and also in the bottom of the frame 127 so that any water accumulating within the cup can drain therefrom. The top 131 of the frame does not extend entirely thereacross but terminates adjacent the longitudinal center thereof and has a series of notches or recesses 132 each of which constitutes a seat for the neck of a bottle located in one of the cups 128. In order that the bottles may be securely fastened within these cups each frame has an elongated yoke 133 pivotally connected to the sides thereof so constructed as to swing either into position upon the upper end of the frame or into a position removed from said end. The intermediate portion of the yoke has notches or recesses 134 designed to register with the recesses 132 and thus keep the necks of the bottles in the frame and prevent their displacement.

Mounted on one side of the frame is a cam

136 having a crank arm 137 secured thereto and extending outwardly therefrom, and this arm when pushed in one direction is designed to force the cam against the yoke 133 so as to direct it into engaging position. The cam when thus shifted will swing against one of the links of chain 103 as shown in Fig. 8 and thus be held against accidental displacement. Extending inwardly from one wall of tank 81 is a tripping arm or bracket 138 which extends into the path of arm 137 and is designed to shift it while moving into the tank so as to swing the cam and close the yoke 133 upon the bottles. The yoke will thus be held by the cam while the rack is being conveyed through the two compartments of tank 81, and while the bottles are held inverted above, and are being operated upon by the rinsing mechanism.

After the bottles have been moved away from the rinsing mechanism they are conveyed upwardly toward the sprockets 98 and to the upper end of an inclined board 139 designed to direct bottles either into a suitable rinsing tank, not shown, or into a series of bottle receiving sleeves 140 similar to the sleeves 32 and carried by endless chains 141, there being spraying devices 142 for washing the outside of each bottle as it passes thereunder. The means employed for releasing the bottles from the racks upon reaching the upper end of board 139 can be of any desired form. In Figs. 11 and 12, however, the preferred means has been shown. This consists of a curved tripping arm 143 supported by a bracket 144 close to chain 103 and the other end of board 139. When each rack approaches this arm 143, said arm wedges back of the crank arm 137. This crank arm will therefore travel along and under the curved face of the arm 143, and will be actuated thereby so as to swing the cam out of locking position. The locking yoke 133 will therefore be free to swing out of engagement with the bottles which can, in turn, slide downwardly from the rack and onto the board 139. In order that the yoke 133 may be positively swung out of engaging position as soon as released a spring 145 is fastened to the yoke 133 and also to the chain 103, this spring operating to hold the yoke normally removed from the top of the rack. As soon as the cam is initially shifted by arm 143 the spring presses the yoke against the cam and further shifts it and this crank arm as shown in Fig. 11. The springs hold the yokes of the racks open after they pass the arm 143 and they remain open until the racks reassume positions adjacent the sprockets 88 at which point the operator refills the racks and moves the yokes into locking position.

With this construction it will be seen that the bottles, after being placed in the racks by the operator who stands adjacent the

sprockets 88, will be carried downward until the locking cams are automatically shifted by the bracket 138 so as to secure the bottles in place. The racks are then carried under the sprockets 102 and 101 within the solution tank and then upwardly over the sprockets 92 after which they are carried downward into the fresh water compartment of the tank and under sprockets 100 and over sprockets 99. It is of course to be understood that all of this movement is intermittent inasmuch as the chain receives its motion from the reciprocating pawl which engages the ratchet wheel 105. The inverted racks are carried above the spraying devices 115 which, when they move upwardly, as described in connection with the other construction, cause the brushes to whirl within the bottles while jets of water are discharged outwardly. The nozzles 117 also act to rinse the interiors of the bottles. This spraying and rinsing operation of course occurs between the movements of the chains 103. The racks are then conveyed upwardly to the releasing mechanism, after which the bottles are discharged in the manner hereinbefore set forth.

What is claimed is:

1. The combination with bottle holding means and mechanism for imparting a step by step movement to said means; of a casing, a water wheel therein, a tubular brush revoluble with the wheel and having outlet openings, means for shifting the brush into the bottle successively between the movements thereof, and means for directing liquid under pressure against the water wheel and into the brush.

2. The combination with bottle holding means, and mechanism for imparting a step by step movement thereto; of a casing, a water wheel therein and having a hollow hub portion provided with inlet openings, a tubular brush revoluble with and opening into said hub portion, said brush having outlet openings, means for shifting the brush into the bottles successively between the movements thereof, and means for directing fluid under pressure against the water wheel at predetermined periods.

3. The combination with bottle holding means and mechanism for imparting a step by step movement thereto; of a rinsing device comprising a vertically movable casing, means for actuating said casing between the movements of the bottles, a water wheel revoluble within the casing and having a hollow apertured hub, a tubular brush extending upward from and communicating with the hub, said brush having outlet apertures, a nozzle connected to the casing and constituting an outlet therefor, and means for directing fluid under pressure into the casing at predetermined intervals.

4. The combination with bottle holding

means and mechanism for imparting a step by step movement thereto; of a casing, a wheel, a spraying brush, means for shifting the brush into bottles successively between the movements thereof, and means for directing fluid under pressure against the wheel and into the spraying brush to simultaneously rotate said brush and to produce a spray therefrom.

10 5. The combination with bottle holding means and mechanism for imparting a step by step movement thereto; of means for rinsing the bottles successively between the movements thereof, said means comprising
15 a vertically movable casing, a hollow hub mounted to rotate therein, blades radiating from the hub, said hub having openings therein, a tubular brush extending from and opening into the hub, said brush having outlet apertures, a discharge nozzle constituting
20 an outlet for the casing, a supply pipe, a flexible tubular connection between said pipe and casing, a valve in the supply pipe, and means operated by the movement of the rinsing mechanism for opening and closing the
25 valve at predetermined intervals.

6. The combination with a plurality of bottle holders, and means for imparting a step by step movement thereto; of bottle
30 rinsing mechanism, means for projecting said mechanism into the bottles successively between movements thereof, and flexibly supported weights coöperating with the rinsing mechanism for bearing upon and
35 holding the bottles during the rinsing operation.

7. The combination with a plurality of bottle holders and means for imparting a step by step movement thereto; of flexibly
40 supported weights suspended above the paths of the holders, rinsing mechanism, means for projecting said mechanism into the bottles successively between the movements thereof, means for rotating that
45 portion of the mechanism within a bottle, winding means for controlling the weights, and means operated by the movement of the rinsing mechanism for actuating the

winding means to raise or lower the weights upon bottles.

8. The combination with bottle holding means and mechanism for imparting a step by step movement thereto; of a spraying
brush, means for shifting the brush into bottles successively between the movements
55 thereof, a water motor for rotating the brush, and means for directing fluid under pressure into the motor to rotate the same, there being apertures within the motor for directing a portion of the motive fluid into
60 the brush during the rotation thereof.

9. The combination with an endless conveyer and bottle holders carried thereby; of a ratchet wheel movable therewith, an oscillating lever, an arm pivotally connected to
65 the lever, a guide therefor, a pawl adjustable longitudinally upon the arm and normally engaging the ratchet wheel, and means for imparting an oscillating movement to the lever to actuate the ratchet wheel and
70 conveyer with a step by step movement.

10. The combination with a tank, a flexible endless conveyer extending through the tank, and holders upon the conveyer for
75 holding bottles; of a second flexible endless conveyer, a series of bottle holders thereon, means for imparting a step-by-step movement to each of the conveyers, a spraying device surrounded by one of the conveyers, and comprising a casing, a water wheel, a
80 brush revoluble with the wheel and constituting a spraying device, means for automatically directing a bottle from one holder of one series to a holder of the other series between movements of said conveyers, and
85 means for directing a fluid into the casing between said movements to rotate the wheel and brush and direct a spray from the brush.

In testimony that I claim the foregoing
90 as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE W. KOCH.

Witnesses:

WM. M. STEWART, JR.,
BOYD L. SPAHR.