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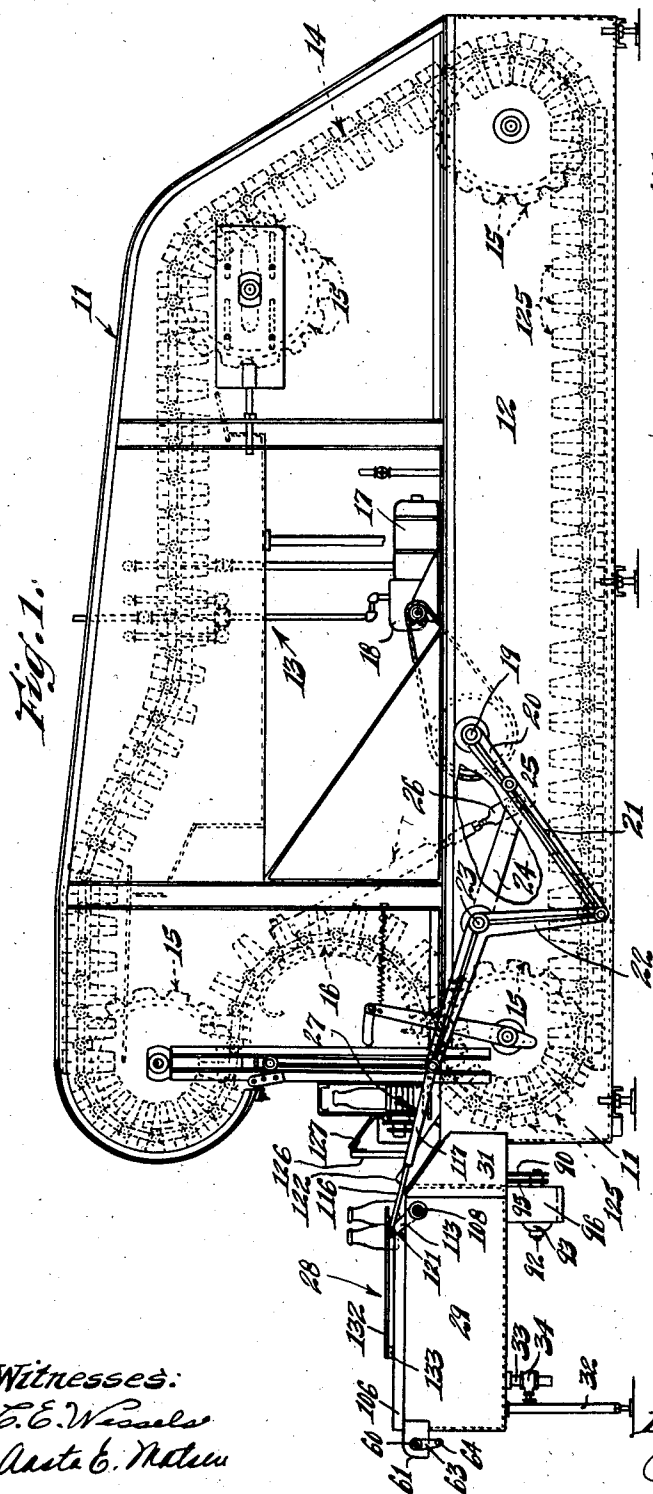
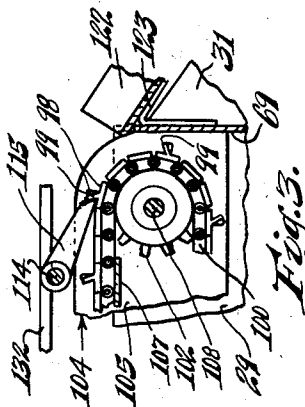
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2,044,041

BOTTLE WASHING AND CONVEYING MECHANISM

Filed Sept. 27, 1933

3 Sheets-Sheet 1



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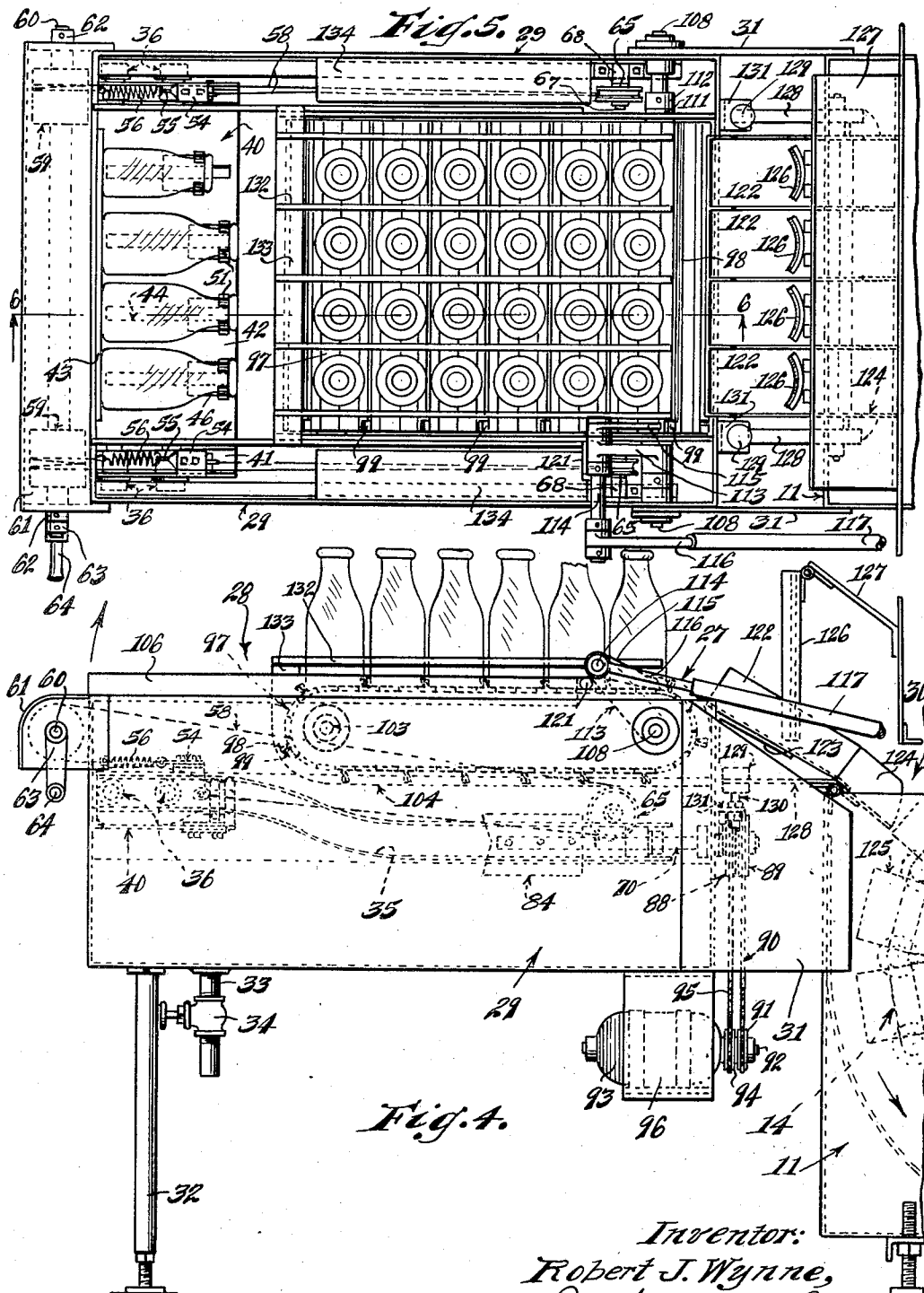
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3 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,044,041

BOTTLE WASHING AND CONVEYING
MECHANISMRobert J. Wynne, Bellwood, Ill., assignor to
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5 Claims. (Cl. 15—59)

My invention relates to bottle washing and conveying mechanism, and an object of the invention is the provision of mechanism of the character described which may be used in conjunction with a bottle washer having a soaking tank, sterilizing apparatus, or other means for cleansing the bottles, and also having a conveyor for conveying the bottles through the various treatments in the cleansing operations. Another object is the provision of mechanism which may be placed at the bottle receiving end of the type of bottle washer shown and is adapted to give the bottles a thorough brushing before they are introduced into the receiving end of the machine to be carried by conveyor mechanism through the various cleansing treatments of the washing machine proper.

Heretofore it has been customary in bottle washing machines to provide brushing mechanism within the main machine proper, and most customarily after the bottle has traveled through the soaking and sterilizing tank. Because of this arrangement bottles have frequently been contaminated by foreign matter collected by the brushes, and oftentimes the subsequent rinses have not proved efficient in removing this source of trouble. In washing bottles having paper labels pasted thereon there has always been difficulty in removing the freed labels from the interior of the soaking tank, and frequently these labels cause the drains to become clogged and thus seriously interrupt the operation of the entire machine. Again it has been found that the labels are sometimes retained by the bottles until they reach the brushing mechanism, and they of course become entangled in the bristles of the brushes and seriously decrease the efficiency of the machine.

I propose to obviate most of these difficulties by placing the brushing mechanism outside of the main machine proper so that the bottles which require brushing may receive it before they enter the soaking and sterilizing tank. In the present known brushing types of machines every bottle entering the main machine proper receives a brushing operation, even though many of them require no such operation. With my machine the attendant inspects the bottles prior to their introduction into the machine, and if they do not require brushing they are placed on the feeding conveyor and passed to the machine immediately. As the attendant finds bottles which require brushing, they may be introduced into my brushing mechanism and brushed until they are entirely clean. Because of this type opera-

tion it can be seen that the brushing period may be prolonged for a sufficient period to produce a satisfactory result, whereas in the present known type of machine each bottle receives the same period of brushing, and if it is not clean when it is delivered from the machine, it is necessary to return it into the main machine proper, and thus a considerable amount of time is wasted.

Another advantage flows from the pre-brushing of the bottles, in that the soda solution contained in the soaking tank remains clean for a longer period of time because the bulk of the foreign matter comes from the extremely dirty bottles which require a considerable amount of brushing. The tank for my brushing mechanism may be of relatively small dimensions, and the solution may be replenished at frequent intervals to insure good washing results; replacement of the soda solution in the soaking tank of the present known type of machine is an expensive operation because of the expense of cleaning soda and the necessary loss of time.

In the present known type of brushing mechanism the bristles frequently become loosened and adhere to the bottles. If they are removed without re-sterilizing them there is a considerable opportunity for contamination, and if they are not removed they will of course cause the output of a very disagreeable product. My new type brush does not employ bristles or other parts which become easily loosened, and consequently the above difficulties are entirely eliminated.

My invention will be best understood by reference to the accompanying drawings, in which:

Fig. 1 is a side elevational view of my entire mechanism having my brushing and conveying mechanism arranged at the receiving end of the bottle washing machine proper;

Fig. 2 is a detail view of the connecting rod which operates the conveying mechanism at the receiving end in conjunction with the main conveyor system of the bottle washer;

Fig. 3 is a detail view of the actuating dog member operatively connected with the connecting rod shown in Fig. 2;

Fig. 4 is an enlarged side elevational view of my brushing and conveying mechanism at the receiving end of the bottle washer;

Fig. 5 is a top plan view of the mechanism shown in Fig. 4;

Fig. 6 is a sectional view, taken substantially on the line 6—6 of Fig. 5 but with the bottle carrier shown in brushing position;

Fig. 7 is a sectional view, taken substantially on the line 7—7 of Fig. 6;

Fig. 8 is a sectional view, taken substantially on the line 8—8 of Fig. 7;

Fig. 9 is a detail view of my brush and attaching means; and

Fig. 10 is a sectional view, taken substantially on the line 10—10 of Fig. 9.

The bottle washing machine shown is generally indicated at 11, and comprises a soaking tank 12, cleansing spraying system indicated generally at 13, conveyor mechanism including chain 14, sprockets 15, guide and supporting rails 16, motor 17, and gear reduction box and shafts indicated generally at 18, which transmit power to main shaft 19. Crank 20 is keyed to shaft 19 and transmits power through connecting rod 21 to bell crank 22 which is secured to rock shaft 23. Interiorly of the machine a connecting rod 24 is keyed to rock shaft 23 and is provided at its opposite end with a stud pin 25 which supports a conveyor advancing member 26. To the other leg of bell crank 22 a connecting rod 27, which is shown in detail in Fig. 2, is pivotally connected, and is the rod from which power is taken for my feeding conveyor mechanism, generally indicated at 28.

A brushing tank 29 is located at the receiving end 30 of bottle washing machine 11, and is secured thereto by attaching plates 31 which may be welded to said brushing tank 29 and receiving end 30 of the bottle washing machine. The other end of brushing tank 29 may be supported by an adjustable leg 32. The bottom wall of tank 29 may be provided with an outlet 33 and valve 34.

Interiorly of tank 29, and placed on opposite longitudinal side walls thereof, may be arranged a pair of channel-like trackways 35, each of said pair of trackways extending in a generally longitudinal direction and arranged at the same angle of inclination throughout their entire lengths. Adjacent the rear ends of trackways 35 they are inclined upwardly and thence horizontally. In each of trackways 35 may be arranged a pair of rollers 36, each of which receives a horizontally extending shaft 37 which extends inwardly of the tank 29 and is received by bearing 38 which is secured to the side wall 39 of a U-shaped channel-like bottle carriage 40. Side walls 39 are of course appropriately apertured to receive shafts 37 and be supported by said shafts. Carriage 40 may comprise the aforementioned side walls 39 having laterally extending flanges 41, and base member 42 having a vertically extending rear wall 43 may be bolted or welded to said flanges 41. Base member 42 may be provided with narrow and elongated slots 44 which extend longitudinally of said carriage 40, and are parallel with each other. Each of said slots 40 may receive an elongated tongue-like lug 45 which is carried by a bottle supporting block 46. Lugs 45 may be held in slots 44 by means of bolts 47 and nuts 48 which clampingly retain stop plates 49 across slots 44. The upper rear edge 50 of block 46 may be inclined downwardly and its sides may be provided with bottle clamping means 51 which may be secured by bolts 52. Side walls 39 may carry upwardly and inwardly extending L-shaped lugs 53, to which may be bolted spring supporting plates 54, the ends of which carry spring supporting eyes 55.

Eyes 55 receive the ends of coil springs 56, the other ends of which are received in supporting eyes 57 attached to cables 58. Cables 58 extend upwardly and rearwardly substantially parallel with the side walls of tank 29 and are passed around drums 59 a number of times to eliminate

slipping. Drums 59 are keyed to a horizontal transversely extending shaft 60, the ends of which extend through the end walls of an inverted U-shaped guard cover 61, and clamping collars 62 retain shaft 60 in place. One end of shaft 60 may carry a crank arm 63 with a handle 64, and the crank may be keyed to shaft 60 so as to cause the rotation thereof. From drum 59 cables 58 proceed forwardly and downwardly through peripheral grooves in rollers 65, and thence to laterally extending lugs 66 upon which the ends of said cables 58 are anchored. Lugs 66 extend inwardly from the side walls 39 of bottle carriage 40 and are located below and forwardly of L-shaped lugs 53. Rollers 65 are supported by laterally extending shafts 67 which are supported on the upper flange of channel trackways 35 by bearing brackets 68.

The front wall 69 of tank 29 is apertured to receive and support a plurality of horizontally extending brush spindles 70 in bearings 71. Spindles 70 extend horizontally from bearings 71 toward the rear of tank 29 through bearings 72 which are supported by horizontal transversely extending bearing supporting member 73 which is supported on the side walls of tank 29 at points between the inwardly extending flanges of channel trackways 35. Collars 74 prevent the rearward movement of spindles 70, and collars 75 prevent their forward movement. Referring to Figs. 9 and 10, the rearward ends of spindles 70 are provided with longitudinally extending open bores 76, the ends of which carry bayonet slots 77. Bores 76 receive reduced ends 78 of brush supporting rods 79, and lugs 80 project laterally in substantially the same plane from reduced portions 78 for cooperation with bayonet slots 77. Pins 81 retain compression springs 82, which carry discs 83 and tend to force reduced portions 78 outwardly of bores 76. Bayonet slots 76 extend longitudinally of spindles 70 for some distance, then turn transversely and extend toward the end of the spindles, and since the spindles are turning in the direction indicated by the arrow in Fig. 10, it can readily be seen that lugs 80 will be forced at all times toward the short sides of slots 77. Since springs 82 force the brush supporting rods 79 outwardly, there will be no likelihood that the brush supporting rods will come out of the spindles.

Brush supporting rods 79 are cut away for approximately half their diameter to allow for the attachment of brush bodies 84 which may be made of sponge rubber and have extending ends 85 for the purpose of reaching the lower outlying extremities of the interiors of bottles. A clamping plate 86 may be held in place on brushes 84 by screws 87.

The forward ends of spindles 70, which extend outside the front wall of tank 29, carry pulleys 88. From an inspection of Fig. 8 it can be seen that the pair of spindles to the left in this figure are somewhat longer than the spindles to the right, so that pulleys 89 may receive a belt 90 which passes over pulley 91 keyed to shaft 92 of motor 93. A pulley 94 is likewise keyed to shaft 92 and receives a belt 95 for cooperation with pulleys 88 which are shown clearly in Fig. 8. Motor 93 turns in the direction indicated by the arrow in Fig. 7, and imparts motion to pulleys 88 and 89 in the same direction. Motor 93 is supported by a depending supporting strap 96 which is secured to the bottom wall of tank 29.

The bottle conveyor mechanism, generally indicated at 28, comprises a belt 97 made up of

transversely extending links and which is provided with projecting T irons 98 in spaced relation to each other around the entire length of belt 97. The ends of T irons 98 on one side of the conveyor belt are cut and bent rearwardly, as shown particularly in Figs. 3 and 5, and provide convenient advancing lugs 99. Belt 97 is secured to conveyor chain 100, which rides on sprockets 101 and 102. Sprockets 101 receive a transversely extending shaft 103, the ends of which extend through and are received by conveyor supporting frame side members 104 of conveyor supporting frame 105. Conveyor frame supporting arms 106 are secured to side frame members 104, and extend rearwardly toward the end of tank 29 and are supported by the upper rear wall thereof. Side frame members 104 are provided with inwardly extending conveyor chain supporting flanges 107. Sprockets 102 receive the chain 100 at the forward end of the conveyor, and transversely extending shaft 108 passes through side supporting frame members 104, and thence through the side walls of tank 29, where the ends of said shaft are received by bearings 109. The shaft 108 supports the front end of the conveyor frame, and the rearwardly extending arms 106 support the rear end, as has been described above. Collars 110 are placed inwardly of sprockets 102 and prevent inward movement of said sprockets. Bearings 111 in side supporting frame members 104 provide suitable supporting and antifrictional surfaces, and collars 112 aid in preventing longitudinal movement of shaft 108.

Shaft 108 pivotally supports a crank arm 113. The upper end of crank arm 113 receives a transverse shaft 114, the inner end of which carries a pivotally mounted dog 115, shown in detail in Fig. 3, which abuts against advancing lugs 99 to cause the rotation of conveyor chain 100. The outer end of shaft 114 receives the connecting rod 27, heretofore described, the other end of which is pivotally connected to the rear leg of bell crank 22, shown in Fig. 1. Fig. 2 illustrates connecting rod 27 in detail. Rod 27 comprises a pair of telescoping members 116 and 117. Member 117 is provided with a longitudinal bore for the reception of member 116 which carries a stop pin 118 for movement in slot 119 of member 117. A compression spring 120 is received in the longitudinal bore of member 117 and abuts against the forward end of member 116 in order to provide lost motion for the crank arm 113. A stop pin 121 limits the rearward movement of crank arm 113.

Bottle chutes 122 are secured to the front end of brushing tank 29 by angle irons 123. To the adjacent transverse vertical wall of soaking tank 12 are secured hinged chute portions 124 for the purpose of delivering bottles to individual bottle pockets 125. Depending swinging cushion plates 126 are supported by brackets 127 secured to the front end of the bottle washing machine 11, and serve to retard the descending of bottles as they tip from conveyor belt 97. The hinged portions 124 of chute members 122 have secured to them rearwardly extending counterweight supporting brackets 128, and these brackets carry counterweights 129 whose downward movements are limited by adjustable stop members 130 carried by angle iron 131 secured to the front wall of tank 29. It can be seen that the hinged arrangement of the forward end of chutes 122 will permit said ends to be forced downwardly by bottles protruding from pockets 125 in case they do not enter said pockets to the full extent; the counterweights

129 will serve to return the portions 124 to the position shown in Fig. 4 as soon as the conveyor chain carrying the pockets 125 has moved in the direction indicated by the arrow in Fig. 4. A series of longitudinally extending bottle guide rods 132, secured to a cross member 133 and the side frame members 104, serve to guide the bottles to chutes 122.

The operation of the machine is as follows:

If the attendant deems it advisable to brush the bottles, they are placed in carriage 40 and held in place by clamps 51. The bottles will then be in the position indicated in Fig. 4. A switch is then closed to send an electric current to motor 93 for the purpose of operating the brush spindles heretofore described. It is to be understood that motor 93 may be in constant operation, since the bottles may be pushed onto the brushes and removed therefrom without any stopping of the motor. When the bottles have been placed in the carriage the crank 63 may be turned in a counter-clockwise direction as shown in Fig. 4, and the carriage 40 will be brought forwardly and downwardly in trackways 35 and will be pushed upon the brushes. Since the brushes are flexible and resilient, they will not be damaged by the compression caused by forcing them into the small bottle necks. The water line in tank 29 is indicated in Fig. 6, and it is adapted to cover the bottle throughout most of its surface so that during the brushing operation the bottle is substantially filled with water. When the attendant is of the opinion that he has permitted them to be brushed for a sufficient length of time the crank 63 may be turned in a clockwise direction so as to cause cables 58 to draw the carriage away from the position shown in Fig. 6. The coil springs 56 are adapted to provide a cushion for the force applied to the crank arm 63, and they also act to take up the slack in the cables 40 necessitated by the downwardly inclined trackways. It can be seen that if the bottle supporting blocks 46 were permitted to remain too far forwardly in the carriage, the force of the brush against the bottle neck would force the bottle to the rear of the carriage so that its bottom would rest on rear wall 43 of the carriage, and would thus provide a secure abutment for the bottles. When the bottles are retracted from the brushes the motion of the brushes continues and would of course splash water outwardly from the tank if some provision were not made for discontinuance. During this interval the feeding conveyor mechanism including belt 97 are directly above the brush spindles as indicated clearly in Fig. 7, and prevent the egress of water from the tank in a directly perpendicular direction. In addition to this provision, however, and in order to eliminate any possibility that water might be thrown from the tank, a pair of laterally extending plates 134 may be secured to the interior walls of tank 29 so as to extend inwardly to a point adjacent the conveyor frame, and thus co-operate with the conveyor belt to prevent splashing.

After the bottles have been brushed sufficiently and have been returned on inclined trackways 35 so as to drain the water from them, the attendant may inspect them in the position shown in Fig. 5. If they are satisfactorily clean, they may be placed on conveyor belt 97 between T irons 98 and in the space between bottle guide rods 132. At each actuation of bell crank 22, shown in Fig. 1, the connecting rod 27 will be drawn forwardly and downwardly and will cause the dog 115 to ad-

vance the conveyor belt by means of conveyor advancing lugs 99 a sufficient distance so that each series of bottles lying in a transverse line such as in Fig. 5 will topple forwardly and be received in chutes 122. The lost motion provided for by the structure of connecting rod 27 is sufficient with other elements to permit a series of bottle pockets 125 to receive the bottles from chutes 122.

In case it is necessary or desirable to change the brushes or inspect them, the conveyor frame supporting arms 106 may be raised in the direction indicated by the arrow in Fig. 4, and the entire conveyor will be raised on the axis of shaft 108. In order to effect the movement of the conveyor to the fullest extent upwardly, it is necessary for the connecting rod 27 to be at the forward end of its travel, since if this were not the case the stop 121 would cause crank 113 to push rod 27 forwardly and against the bell crank 22 in the position shown in Fig. 1. Since the bell crank is at the upward limit of its travel, the rod could not move forwardly any farther than the distance permitted by spring 120 in the member 117. It can be seen that by raising the conveyor as above indicated, all parts in the tank 29 will be rendered accessible for repairs, replacement, or cleaning.

What is herein termed the main machine, and as indicated at 11 in Fig. 1, is shown and described with more particularity in two applications for patents filed on even date herewith, one of which is entitled Bottle handling mechanism, and given Serial No. 691,123, now matured into Patent No. 1,988,963, and the other of which is entitled Bottle handling mechanism, and given Serial No. 691,124, now matured into Patent No. 1,981,684.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. A bottle washing machine including a fluid tank and bottle conveyor therein; in combination with a preliminary cleaning device comprising a soaking tank arranged adjacent the receiving end of the first said tank, an endless conveyor arranged over said soaking tank and upon which bottles are to be manually placed, means for

moving said endless conveyor toward said bottle conveyor by a step by step motion, means at the end of the conveyor for inverting the bottles and inserting them in the bottle conveyor, and a reciprocating bottle carrier, arranged in said soaking tank beneath said endless conveyor, bottle brushing means in the forward end of said soaking tank adapted to enter the bottles upon said reciprocating carrier when in forward position, there being space between the rear end of the soaking tank and the adjacent end of the endless conveyor to permit placing bottles on and removing the same from the reciprocating carrier, substantially as described.

2. A device as set forth in claim 1 in combination with guides for said reciprocating carrier, said guides being shaped to submerge the reciprocating carrier and the bottles thereon when moved to brushing position, and to elevate the same upon retraction of the carriage, substantially as described.

3. A device as set forth in claim 1 in which said brushes are submerged in the fluid of the soaking tank, and in which the endless conveyor above the same includes a plurality of transverse plates mounted upon endless belts and with their edges in proximity to form a shield for the splash from said brushes, substantially as described.

4. In a bottle washing machine, a pre-cleaner comprising a soaking tank, revoluble brushes arranged in the forward end of said tank, a reciprocating bottle carrier and means adapted to submerge the carrier and the bottles as they are moved toward said brushes and said brushes adapted to enter the bottles when the bottles are in forward position, means for reciprocating said carrier, a frame pivotally mounted adjacent the forward end of said soaking tank and including a pair of side members, the rear ends of which are adapted to rest upon the rear end wall of said soaking tank, and an endless conveyor mounted between said side members and above said brushes, and including a series of transverse plates, certain of said plates having upstanding flanges to engage the bottles resting thereon and means for moving said endless conveyor with a step by step motion, substantially as described.

5. A device as set forth in claim 4 further characterized by a pivotally mounted crank arm at the side of said conveyor, a pawl on said crank arm, lugs on the ends of the conveyor plates adapted to be engaged by said pawl, and means for oscillating said crank arm, substantially as described.

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