Feb. 19, 1935. E. L. MOBERG 1,991,862

TREATMENT OF BOTTLED GOODS

Filed April 2, 1932 7 Sheets-Sheet 1

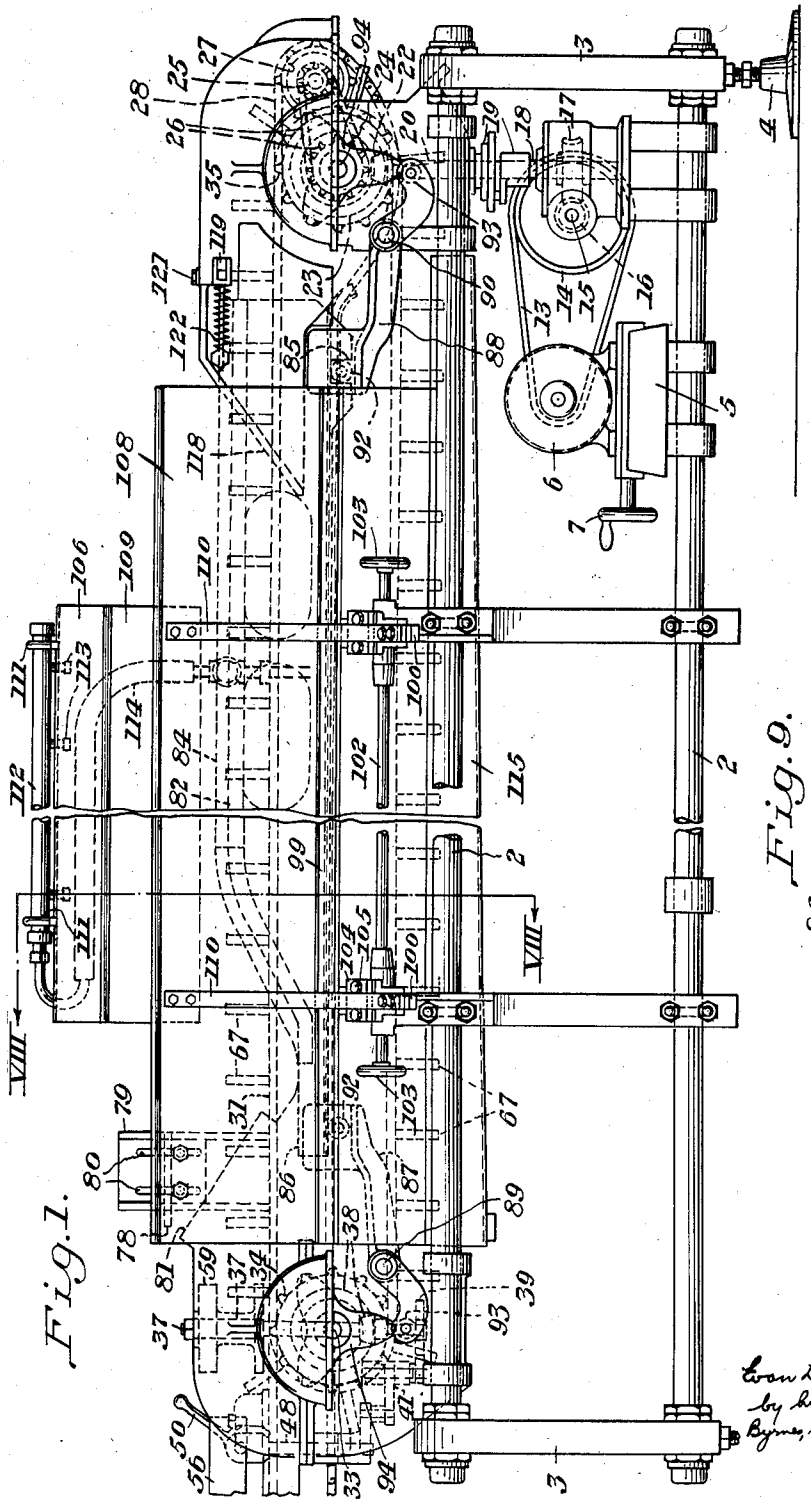


Fig. 1.

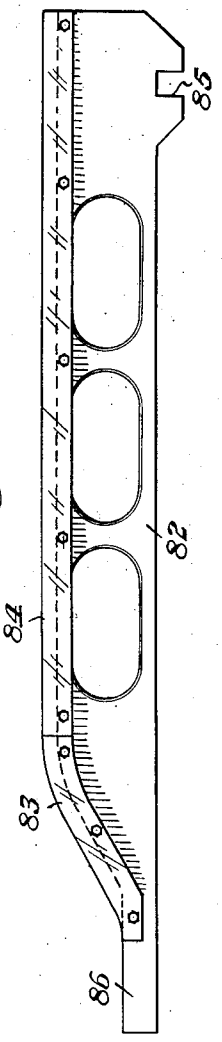


Fig. 9.

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TREATMENT OF BOTTLED GOODS

Filed April 2, 1932 7 Sheets-Sheet 2

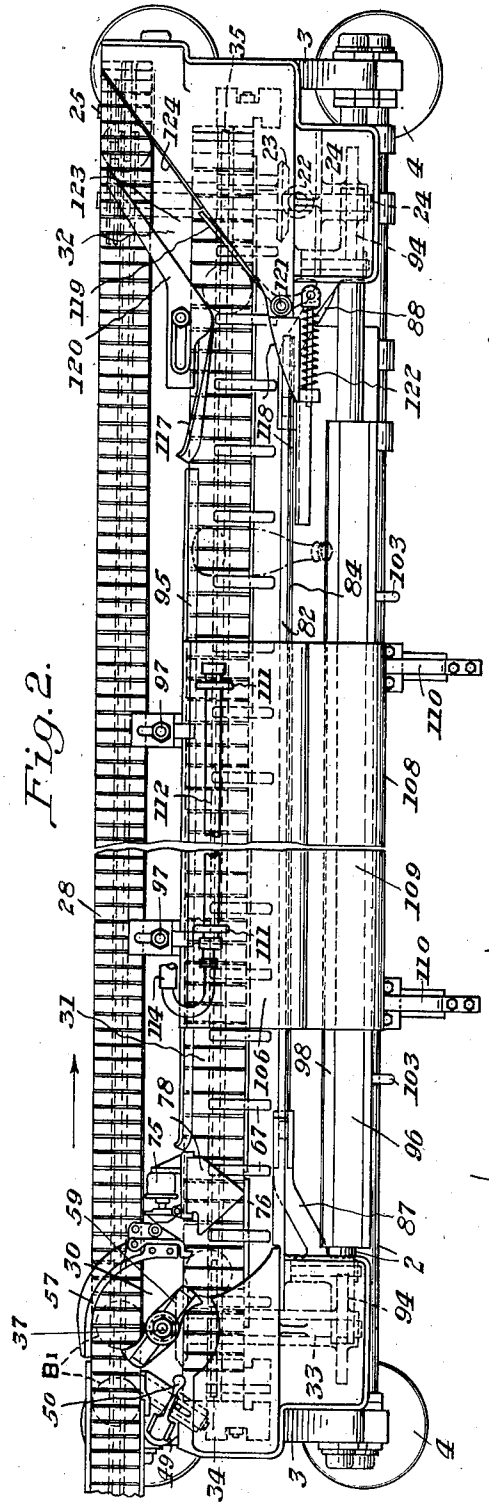


Fig. 2.

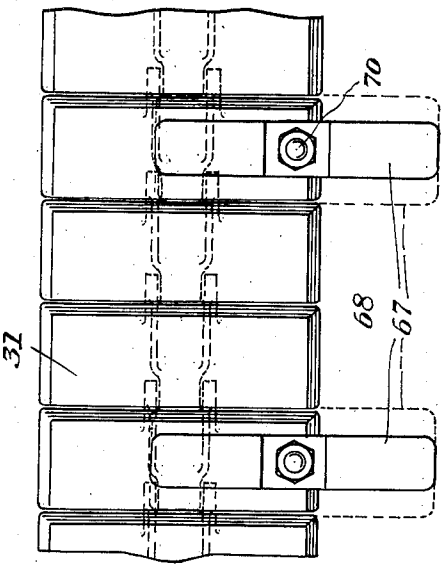


Fig. 7.

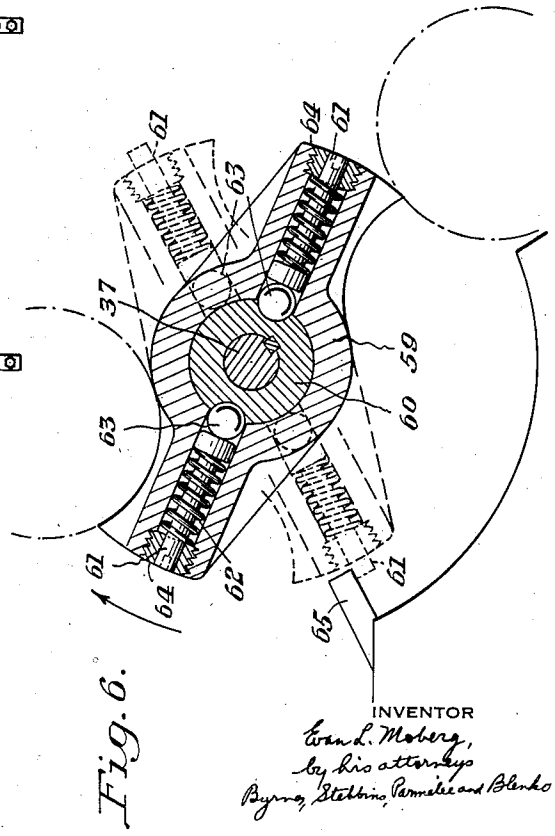


Fig. 6.

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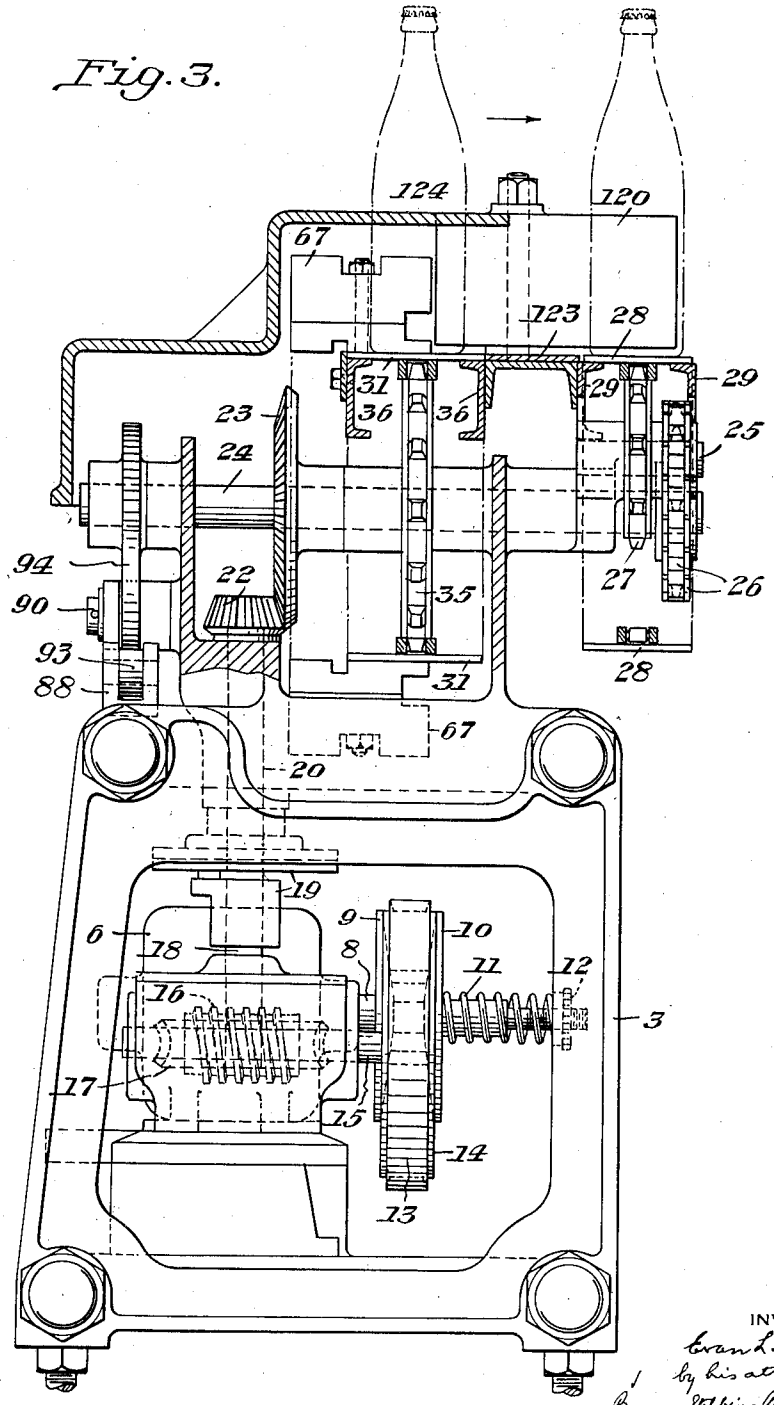
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TREATMENT OF BOTTLED GOODS

Filed April 2, 1932 7 Sheets-Sheet 3

Fig. 3.



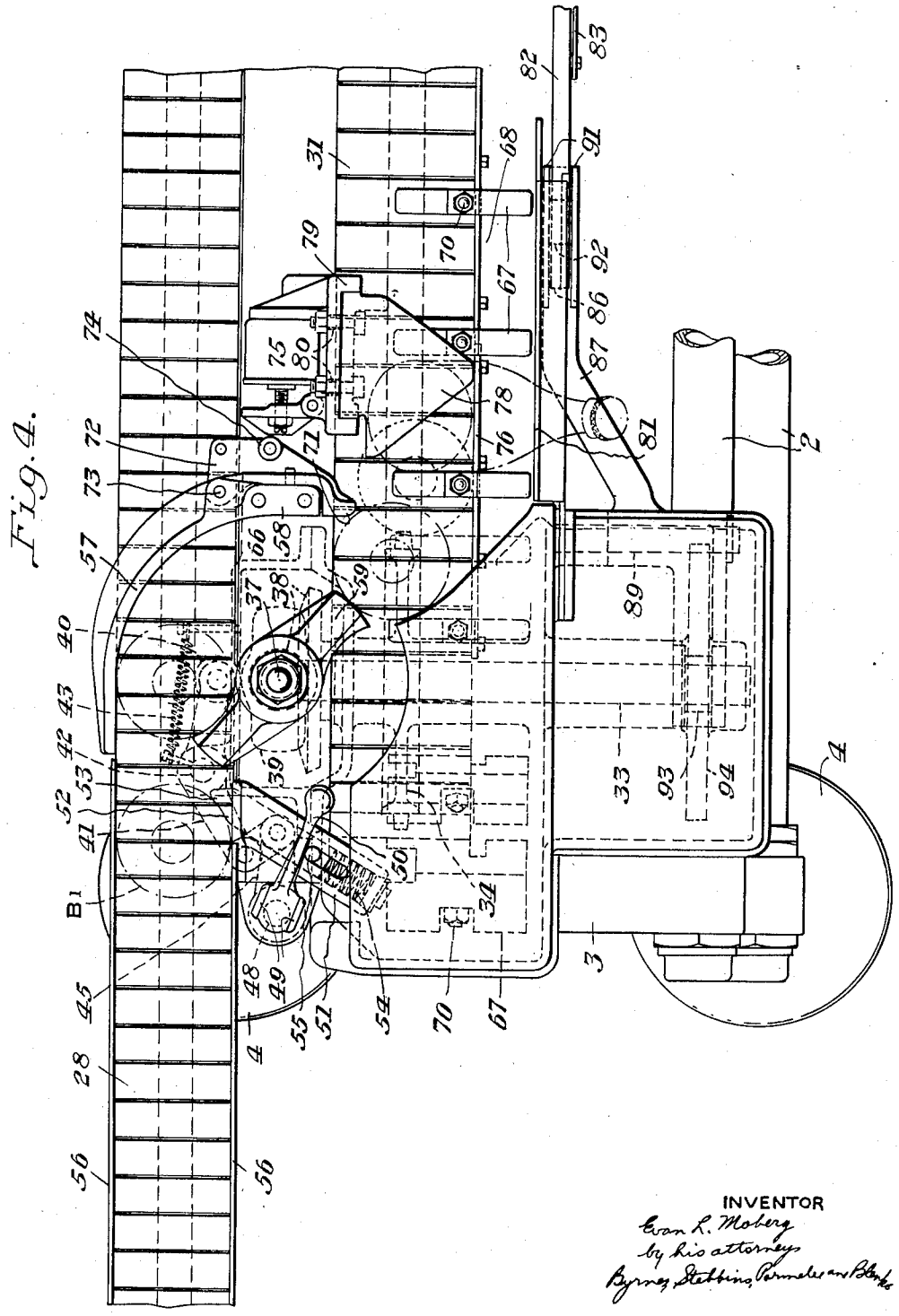
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Feb. 19, 1935. E. L. MOBERG 1,991,862

TREATMENT OF BOTTLED GOODS

Filed April 2, 1932 7 Sheets-Sheet 4

Fig. 4.



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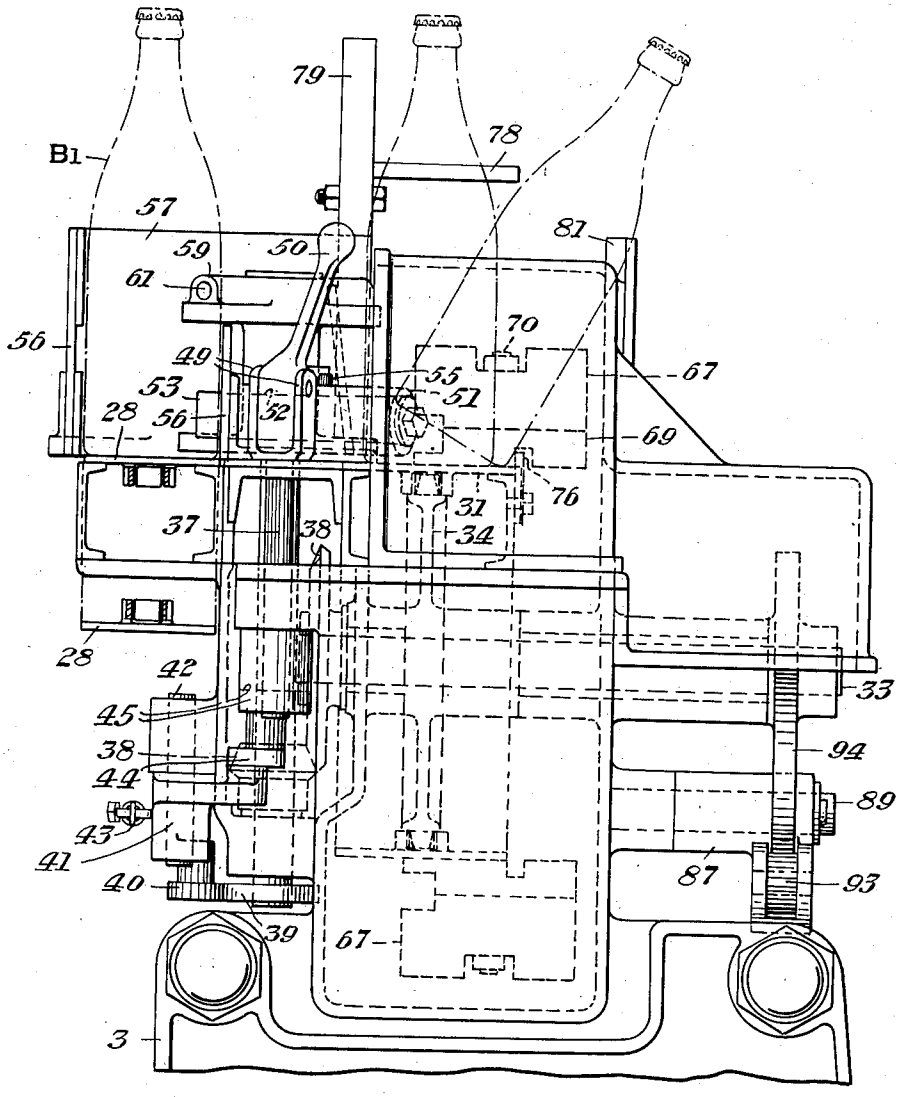
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TREATMENT OF BOTTLED GOODS

Filed April 2, 1932 7 Sheets-Sheet 5

Fig. 5.



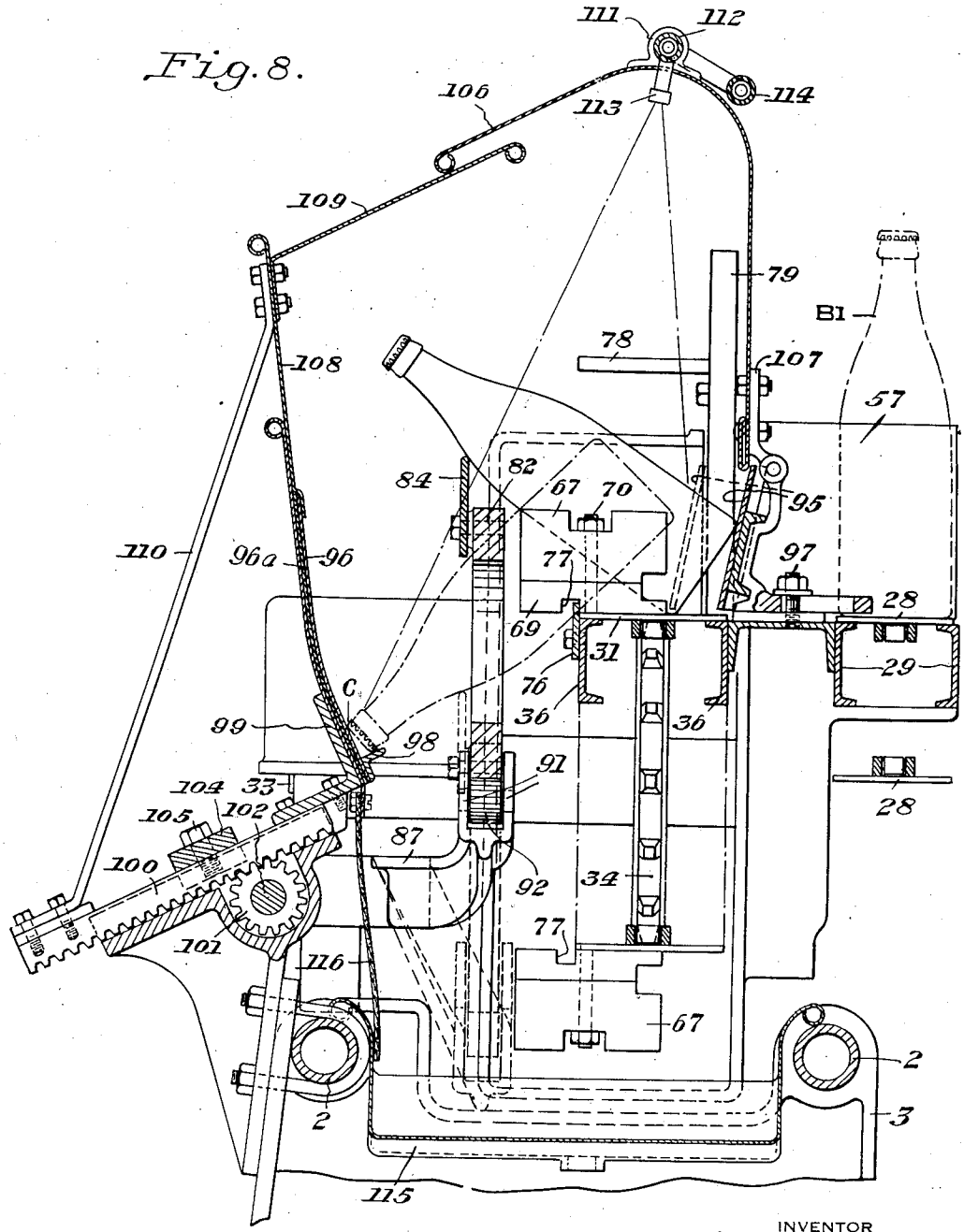
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TREATMENT OF BOTTLED GOODS

Filed April 2, 1932 7 Sheets-Sheet 6

Fig. 8.



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Feb. 19, 1935. E. L. MOBERG 1,991,862

TREATMENT OF BOTTLED GOODS

Filed April 2, 1932 7 Sheets-Sheet 7

Fig. 10.

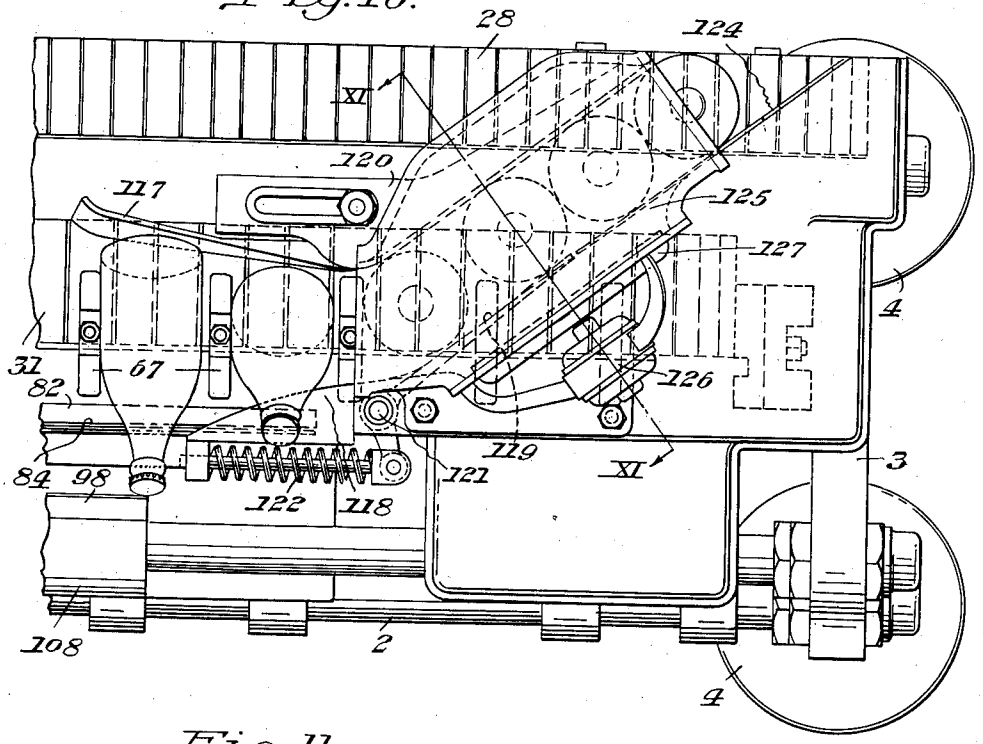
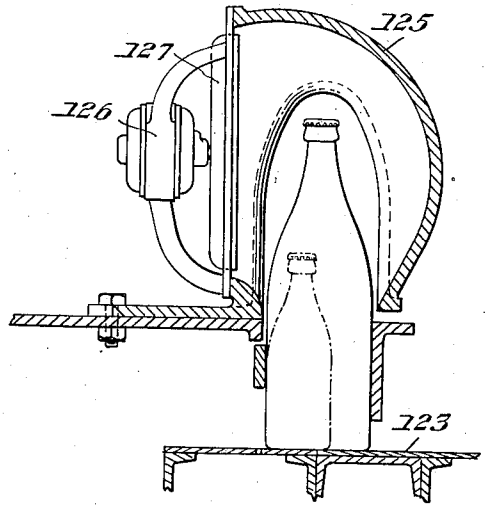


Fig. 11.



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Patented Feb. 19, 1935 1,991,862

UNITED STATES PATENT OFFICE

1,991,862

TREATMENT OF BOTTLED GOODS

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Application April 2, 1932, Serial No. 602,825

11 Claims. (Cl. 259—48)

This invention relates to the treatment of bottled goods, as, for example, soft drinks. It is usual practice in the soft drink industry to fill bottles by discharging into them a measured charge of syrup of the desired flavor and thereafter filling the bottle with carbonated water. The modern requirements of the industry are such that the carbonated water must be fed to the bottles quietly and with a minimum of disturbance, and, since the charge of syrup in the bottle is relatively heavy and thick, the syrup and the carbonated water are not thoroughly mixed if at all when the bottles are discharged from the filling machine. It has heretofore been proposed to agitate the bottles in some fashion after they leave the filling machine so as to effect mixing of the contents, but the machines proposed for this purpose have been generally impracticable. They have been of such length and construction that they are not adaptable to the space requirements of the usual bottling plant, and the manner of handling the bottles has been undesirable.

I provide a machine which may be embodied in a relatively small compass and which may be fitted into the conveying system usually employed in bottling plants. As the bottles travel through the machine they are preferably supplied in a vertical position to a conveyor which carries them through the agitating zone. In this zone each bottle is first tilted over so as to lie on its side. The bottom end of the bottle is supported by the conveyor and means alongside the conveyor are provided for engaging the bottle near the neck end and effecting a raising and lowering of such end. Preferably the neck end is alternately lowered below the plane of the conveyor and raised above it. It is found in practice that this gives a very rapid and effective mixing action, and only a few alternations are required to thoroughly mix the syrup and carbonated water. The construction of the machine is greatly simplified by the use of this principle. I also make provision for washing the bottles as they are being agitated. By reason of the type of movement imparted to the bottles, all portions of the outer surface thereof are readily reached by a spraying device, and the agitation following the spraying is effective for shaking off a large amount of the water. This may be followed, if desired, by a drying blast as supplied, for example, by a fan which effects further drying. This is quite important in practice because in many plants the bottles are taken to a labeling machine, and if too wet a great deal of difficulty is there encountered. The label will not stick to the wet bottles and the labeling machine must be periodically shut down for removal of labels, etc.

In the accompanying drawings illustrating a present preferred embodiment of the invention,

Figure 1 is a side elevation, partly broken away, showing the machine. In this view, as in Figure 2, the drying mechanism is omitted for the sake of clearness.

Figure 2 is a top plan view thereof.

Figure 3 is an end view to enlarged scale, certain of the parts being broken away.

Figure 4 is a top plan view to enlarged scale showing the feeding end of the machine and illustrating the transfer of bottles to the conveyor which supports them while they are being agitated.

Figure 5 is an elevation to enlarged scale of the feeding end of the machine.

Figure 6 is a detail view in horizontal section showing the feed wheel.

Figure 7 is a detail view showing the conveyor chain.

Figure 8 is a transverse section to enlarged scale taken on the line VIII—VIII of Figure 1.

Figure 9 is a side elevation of the member which supports the neck ends of the bottles and raises and lowers the same.

Figure 10 is a top plan view to enlarged scale showing the discharge end of the machine; and

Figure 11 is a section on the line XI—XI of Figure 10.

The general arrangement of the machine is illustrated in Figures 1, 2 and 3. The several parts are supported on a frame made of longitudinally extending pipes 2 connecting end brackets 3 which, in turn, are supported on adjustable feet 4. The lower pipes 2 carry a base 5 on which is slidably mounted a driving motor 6. The position of the motor is adjusted by a hand-wheel 7. The shaft 8 (see Figure 3) of the motor 6 carries a cone faced disc 9 fixed to the shaft. An opposed disc 10 is splined on the shaft and is urged toward the disc 9 by a spring 11 whose compression is adjusted by a hand nut 12. The opposed discs 9 and 10 constitute the driving pulley for a feed belt 13 which extends around a driven pulley 14 on a worm shaft 15. Adjustment of the hand-wheel 7 serves to move the motor 6 toward or away from the shaft 15, and since the length of the feed belt 13 is fixed, this effects a simple speed adjustment of the machine since the effective radius of the driving pulley is necessarily determined by the position of the motor with respect to the shaft 15.

A worm 16 (see Figure 3) on the shaft 15 meshes with a worm wheel 17 on a vertical shaft 18. The shaft 18 drives a friction clutch 19 carried on a shaft 20. The shaft 20 is co-axial with the shaft 18, the purpose of the friction clutch being to prevent breakage if the machine should jam or become overloaded.

The shaft 20 carries a bevelled pinion 22 meshing with a bevelled pinion 23 on a cross shaft 24. The shaft 24 drives a parallel shaft 25 through a chain and sprocket drive 26. The shaft 25 carries a sprocket 27 which drives a conveyor belt 28. The conveyor belt 28 in its upper flight runs along guides 29 which may be extended an indefinite distance as desired. The bottles to be treated are supplied to the machine by the belt 28 which runs in the direction of the arrow shown in Figure 2, and the chain belt will ordinarily be extended to the source of supply of the filled bottles; for example, the filling machine.

Bottles to be treated are indicated by dotted circles at B_1 in Figure 2. When they reach the machine herein described they are first engaged by a feeding mechanism indicated generally by the reference character 30 and are fed thereby to a conveyor belt 31, by which they are conveyed (but not supported) through the machine. After treatment they are transferred back onto the conveyor belt 28 by a discharge mechanism indicated generally at 32 and thence are transferred to a labeler, or elsewhere, as desired.

The feeding mechanism is best illustrated in Figures 1, 2 and 4 to 7 inclusive. It is driven from a foot shaft 33 carrying a sprocket 34 for the chain belt 31. A sprocket 35 on the shaft 24 drives this belt. The belt in its upper flight runs on guides 36 (see Figure 3). The shaft 33 drives a vertical shaft 37 through bevel gearing 38. At its bottom end the shaft 37 carries a cam 39 engaging a roller 40 on a rocker arm 41 pivoted on a stud 42. A spring 43 urges the roller 40 against the cam. The rocker 41 is connected by a link 44 to a lever 45 on a vertical shaft 48. Continuous rotation of the shaft 37 is effective through this mechanism for oscillating the shaft 48. The shaft 48 has a forked head 49 carrying an arm 50 which may be moved by hand from the horizontal position indicated in Figure 4 to a vertically extending position indicated in Figure 5. When the arm is in the position of Figure 5 no bottles are fed to the machine, but when it is thrown to its lowered position feeding is effected. The frame of the machine carries a guide 51 for a sliding dog 52 having a nose 53 which is projected into the path of the on-coming bottles B_1 by a spring 54. A pin 55 projects through a slot in the guide 51 and when the arm 50 is in its lowered position it engages this pin. Oscillation of the shaft 48 is, therefore, effective, when the arm 50 is in its lower position, to move the dog 52 into and out of the path of the bottles.

The cam 39 is so designed with respect to the speed of the conveyor 28 that the dog is retracted a sufficient time to allow one bottle to pass, and it is then moved forward to block the next bottle. It will be understood, of course, that as the bottles move forward on the conveyor 28 they lie between side guides 56.

As each successive bottle is fed past the dog 52, the conveyor brings it into engagement with a curved guide 57 having a portion 58 extending transversely of the machine. The curved face of the guide 57 is arcuate, the center of curvature being the axis of the shaft 37. The top portion of this shaft carries a two-armed spider 59 which cooperates with the guide 57 to feed bottles from the conveyor 28 onto the conveyor 31. This spider is rotatably mounted on a sleeve 60 which is keyed to the top of the shaft 37 (see Figure 6). Each arm of the spider is bored to receive a plunger 61 backed by a spring 62. The head of each plunger engages a ball 63 and urges it into a recess formed in the sleeve 60. When the balls 63 are in their recesses the ends of the plungers 61 are flush with the peripheral faces 64 of the spider arms. The recesses for the balls 63 are so positioned as to properly locate the spider angularly on the shaft 37 with respect to the cam 39 so that rotation of the shaft 37 will bring one arm of the spider into engagement with a bottle after it has passed the dog 52. In the event of a bottle jamming after it passes the dog but before it is fed onto the conveyor 31, the resistance offered by the bottle cams the balls 63 out of their recesses as indicated in dotted lines on Figure 6. When this occurs the ends of the plungers 61 project outwardly beyond the peripheral faces 64 of the arms so as to be engageable by a finger 65 which actuates a switch stopping the motor 6. This constitutes a safety device preventing improper feeding of bottles to the machine.

In normal operation the spider 59, cooperating with the guide 57, feeds the bottles across a table 66, lying in the same plane as the top surfaces of the conveyors 28 and 31, and onto the conveyor 31. The conveyor 31 carries a series of spaced paddles 67 which divide the conveyor into pockets 68 each adapted to receive a bottle. The paddles 67 are mounted on blocks 69 which are permanently secured to the links of the chain. The blocks carry studs 70 which hold the paddles in place. The paddles are removable so that wider ones, as indicated by dotted lines in Figure 7, may be substituted when dealing with bottles of smaller size. The timing of the machine is such that a pocket 68 is presented to the on-coming bottle as it is swept across the table 66 by the spider 59 and onto the conveyor 31. The bottles are carried forward in a vertical position after being delivered to the conveyor 31. This is a very desirable feature of the machine as it insures proper positioning of the bottles and also permits of the use of a simple but effective safety mechanism. As the bottles are carried forward on the conveyor 31 they are engaged by the heel 71 of a lever 72 which is pivoted at 73. The lever is held in the position shown in Figure 4 by a spring (not illustrated). The heel 71 guides the bottles transversely on the conveyor belt 31 and deeply into the pockets 68. If the bottles are not properly accommodated by the pockets 68 and do not move to the desired position for the next subsequent step, an undue pressure against the heel 71 is caused by the on-coming bottle, and the lever 72 is swung counter-clockwise, as viewed in Figure 4. This brings a roller 74 into engagement with a switch mechanism 75, immediately stopping the motor 6.

In normal operation the bottles are urged into the pockets until their bases lie near a heel strip 76. This heel strip is well illustrated in Figure 8. It is secured to one of the conveyor guides 36 and projects above the top plane of the conveyor belt 31. The blocks 69 are notched, as indicated at 77, so as to accommodate this strip. As the bottles move forward they are engaged adjacent their neck portions by a tipping cam 78 which throws the bottle over on its side. The tipping cam 78 is slidably mounted in a standard 79 provided with slots 80 (Figure 1) whereby the cam may be adjusted vertically to accommo-

date different sized bottles. After the bottle is engaged by the cam 78 the heel strip 76 prevents it from moving transversely and regaining its vertical position. The heel strip, by preventing sidewise movement of the bottom of the bottle, insures that it will be thrown over on its side. As the bottle is tilted and tends to fall, it is engaged adjacent its neck portion by an inclined plate 81 which limits the falling movement. The bottle is held with its axis in a plane substantially at right angles to the direction of travel of the conveyor 31 by the paddles 67, but after the conveyor 31 moves forward the neck portion of the bottle, sliding down the inclined plate 81, approaches more and more nearly a horizontal position, and then the mouth of the bottle is further lowered until it lies below the plane of the conveyor 31. This motion is accomplished with considerable rapidity and as a result the heavy syrup in the bottom of the bottle is thrown toward the mouth, thus initiating the very thorough mixing which is accomplished by my machine.

Continued forward movement of the conveyor 31 carries the bottle along until the neck portion thereof leaves the inclined plate 81, whereupon it is engaged by an agitating bar which is illustrated in detail in Figure 9. The agitating bar comprises a plate 82 having wear strips 83 and 84 along the top thereof. The strip 83 is inclined and merges into the straight strip 84. The agitating bar is notched at one end, as indicated at 85, and has a finger 86 at the other end. The agitating bar is supported by two levers 87 and 88 pivoted to the frame of the machine respectively at 89 and 90. Each of these levers is forked, as best shown at 91 in Figure 4, so that the bar is held in vertical position. Between the forks of each of the levers there is provided a roller 92. The roller for the lever 88 fits into the notch 85 so as to prevent free longitudinal movement of the agitating bar. The finger 86 of the bar rides freely on the corresponding roller for the lever 87. The levers 87 and 88 are each provided with follower rollers 93 engaged by cams 94. There is a cam on the shaft 24 for actuating the lever 88 and a cam on the shaft 33 for actuating the lever 87. These cams are synchronized so that the levers 87 and 88 move up and down together. As the bottles are carried along through the machine by the paddles 67, the agitating bar, moving up and down, tilts the bottles between the solid line and the dotted line positions of Figure 8, thus rather violently throwing the liquid in the bottle from one end to the other and thoroughly mixing the contents. During this operation endwise movement of the bottle is restrained by face plates 95 and 96. The face plate 95 engages the bottom of the bottle. It is adjustable as to position by bolts 97. The face plate 96 engages the crown C of the bottle and is curved as shown in Figure 8. A ledge 98 is provided at the bottom of the plate 96 so as to limit downward movement of the bottle top. The plate 96 is supported on a structural angle 99 having perpendicularly projected rack bars 100. The rack bars are engaged by pinions 101 on a shaft 102 provided with hand wheels 103. Clamps 104 and clamping bolts 105 are provided for holding the plate in position. It may be adjusted by loosening the bolts 105 and turning the hand wheels 103 to move the plate 96 to the desired position, whereupon the bolts 105 are tightened, holding the plate in adjusted position. The plate 96 is backed by a rubber sheet 96a which deadens the sound of bottles engaging the plate 96.

As the bottles move through the machine they are given, in addition to the tilting motion, a certain amount of rolling motion by reason of engagements by the bottles of the wear strip 84 and the wear plates 95 and 96. This movement makes the machine ideal for washing off the bottles by a spray, since all portions are thus exposed. The spraying mechanism for washing the bottles is best illustrated in Figures 1 and 8. A sheet metal housing is provided, this housing consisting of a fixed bent sheet 106 extending from brackets 107 secured to the frame of the machine and cooperating metal sheets 108 and 109 extending from above the plate 96 and stiffened by braces 110. These plates are movable with the plate 96, but cooperate with the bent sheet 106 to form a housing closed, except at the ends and bottom, in any adjusted position of the plate. The sheet 106 carries clips 111 supporting a longitudinally extending manifold pipe 112 which supplies nozzles 113 with spray water. The manifold pipe is connected to a water pipe 114, as illustrated in Figure 1. The dot-and-dash lines in Figure 8 show the effectiveness of the spray in washing the bottles. The wash water, after striking the bottles, flows downwardly and is collected by a trough 115 between the pipes 112 of the frame. A flexible baffle sheet 116 is connected to the adjustable plate 96 so as to direct the water into the trough 115 in any adjusted position of the plate.

When the bottles have traveled the operative length of the machine they are again placed upright on the conveyor 31 for discharge. As they near the discharge mechanism 32, their bottoms are engaged by a tapering heel plate 117 and their neck portions are engaged by a plate 118. The neck portions are delivered onto the plate 118 because the machine is so timed that as a pocket 68 reaches a position alongside such plate the agitating bar 82 is in raised position. It will be noted from Figure 10 that the agitating bar terminates beneath the plate 118 so that there is continuity of support for the bottle neck. As will be evident from Figure 10, the bottles which are held by the paddles 67 with their axes lying in planes perpendicular to the direction of travel of the conveyor 31 are gradually brought back to vertical position and finally stand upright on the conveyor. They are then urged sidewise by a guide 119 cooperating with a guide 120. The guide 120 is adjustable toward or away from the guide 119 to take care of different sized bottles. The guide 119 is pivoted at 121 and is biased toward the guide 120 by means of a spring 122. This reduces the tendency of the bottles to tip over as they are forced out of the pockets 68. As the bottles move out of the pockets 68 they are supported in part by the conveyor chain 31 and in part by a table 123 lying between the conveyor chain 31 and the conveyor chain 28. The bottles crowd one another along the space between the guides 119 and 120. A fixed guide 124 forms a continuation of the guide 119. The bottles are fed across the conveyor 28 and thence to any desired point.

As has been stated, the bottles are washed during their travel through the machine. After washing the agitation serves to separate a large amount of the water from the bottles, but it is nevertheless desirable in certain circumstances to subject them to further drying. This is particularly true if they are to be labeled. Figures 10 and 11 show a hood 125 which encases the bottles in their movement through the discharge

mechanism 32. In these drawings there is illustrated diagrammatically a motor 126 driving a fan 127 which throws a blast of air over the bottles and effectively removes any residual moisture therefrom, thus better conditioning them for labeling.

While I have illustrated and described the present preferred form of my invention, it will be understood that it is not limited thereto but may be otherwise embodied and practiced within the scope of the following claims.

I claim:

1. A machine for treating bottled goods comprising a conveyor belt for supporting the bottom end of a bottle lying on its side, vertically movable means alongside the support for engaging the bottle near the neck end and effecting raising and lowering of such end above and below the plane of support, means for feeding bottles to the conveyor while in standing position, and means for tilting such bottles after they have been received by the conveyor so as to cause them to lie on their sides.

2. A machine for treating bottled goods comprising a conveyor belt for supporting the bottom end of a bottle lying on its side, vertically movable means alongside the support for engaging the bottle near the neck end and effecting raising and lowering of such end above and below the plane of support, means for feeding bottles to the conveyor while in standing position, means for tilting such bottles after they have been received by the conveyor so as to cause them to lie on their sides, and safety means for stopping movement of the bottles if they are improperly fed.

3. A machine for treating bottled goods comprising means lying in a substantially fixed longitudinally extending plane for supporting the bottom end of a bottle while lying on its side, vertically movable means alongside the support for engaging the bottle near the neck end and effective for raising and lowering such end, and means engaging the top of the bottle for holding it in engagement with the support.

4. A machine for treating bottled goods comprising means lying in a substantially fixed longitudinally extending plane for supporting the bottom end of a bottle while lying on its side, means alongside the support for engaging the bottle near the neck end and effective for raising and lowering such end, and means engaging the top of the bottle for holding it in engagement with the support, the last mentioned means being adjustable toward or away from the support.

5. A machine for treating bottled goods comprising a conveyor for receiving bottles in upright position, means lying alongside the conveyor for engaging the bottle near the bottom thereof, and vertically movable means for engaging the bottle at a point remote from the bottom thereof and cooperating with the last mentioned means to effect tilting of the bottle above and below the plane of support as it is carried forward by the conveyor, the conveyor having transverse members thereon effective for positively moving the bottle forward.

6. A machine for treating bottled goods comprising a conveyor for receiving bottles in upright position, means lying alongside the conveyor for engaging the bottle near the bottom thereof, and vertically movable means for engaging the bottle at a point remote from the bottom thereof and cooperating with the last mentioned means to effect tilting of the bottle as it is carried forward by the conveyor, the conveyor having transverse members thereon effective for positively moving the bottle forward, the cross members being notched to accommodate the means which engage the bottle near the bottom.

7. A machine for treating bottled goods comprising means lying in a substantially fixed longitudinally extending plane for supporting the bottom end of a bottle while lying on its side, vertically movable means alongside the support for engaging the bottle near the neck end and effective for raising and lowering such end above and below the plane of the support, and means for washing the bottles while being thus moved.

8. A machine for treating bottled goods comprising means lying in a substantially fixed longitudinally extending plane for supporting the bottom end of a bottle while lying on its side, vertically movable means alongside the support for engaging the bottle near the neck end and effective for raising and lowering such end above and below the plane of the support, a hood through which the bottles travel on the support, and spray means for engaging the bottles within the hood.

9. A machine for treating bottled goods comprising spaced shafts, a conveyor belt extending therebetween, the conveyor belt being adapted to receive and support bottles, cams on the shafts, and a support vertically reciprocated by the cams, the support lying alongside the conveyor and cooperating therewith to support bottles lying on their side.

10. A machine for treating bottled goods comprising means lying in a substantially fixed horizontally extending plane for supporting the bottom end of a bottle lying on its side, and vertically movable means alongside the support and cooperating therewith for supporting the bottle near the neck end and effective for raising and lowering the neck end above and below the plane of the support and means for reciprocally moving the said movable means while the bottle is traveling through the machine.

11. A machine for treating bottled goods comprising spaced shafts, a conveyor belt extending therebetween, the conveyor belt being adapted to receive and support the bottom end of a bottle lying on its side, cams on the shafts, and means lying alongside the conveyor and vertically reciprocated by the cams for engaging the bottle near the neck end and effective for raising and lowering such end.

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