H. J. CHILTON.

BOTTLE HANDLING APPARATUS.

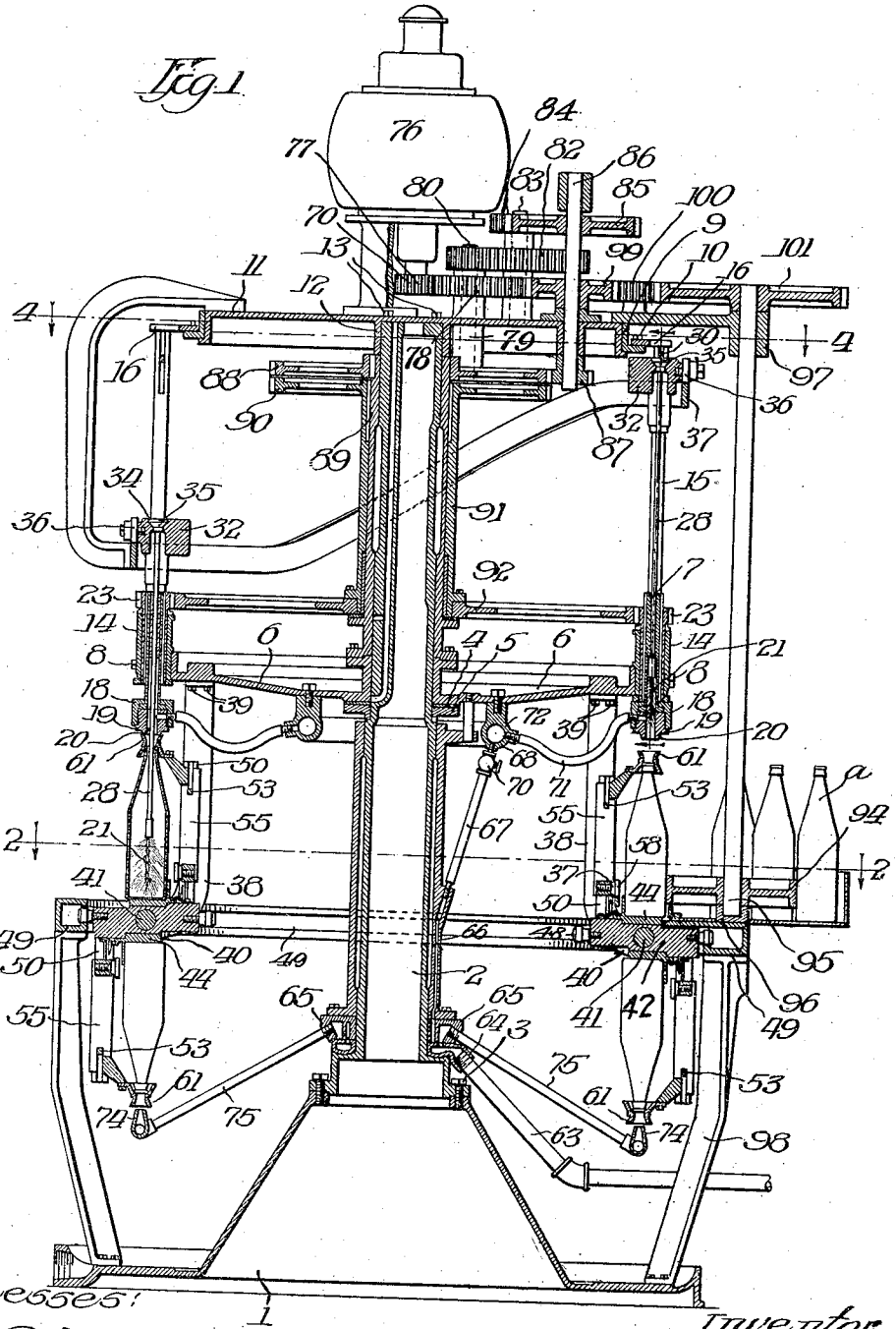
APPLICATION FILED MAR. 26, 1914.

1,244,701.

Patented Oct. 30, 1917.

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

Fig. 2.

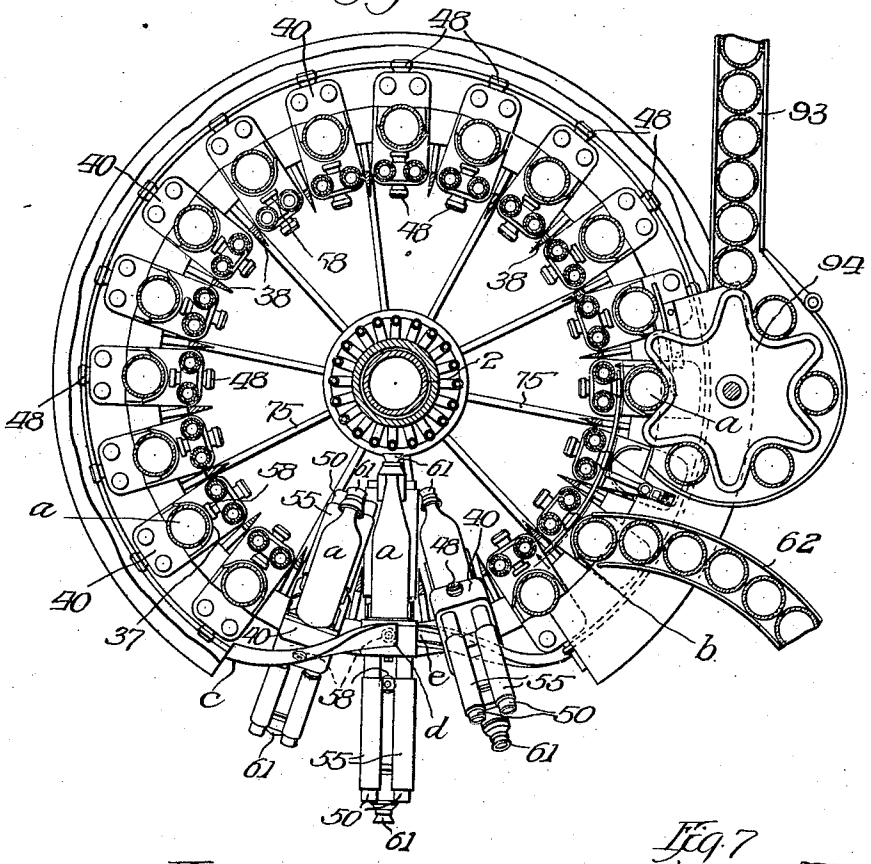


Fig. 8

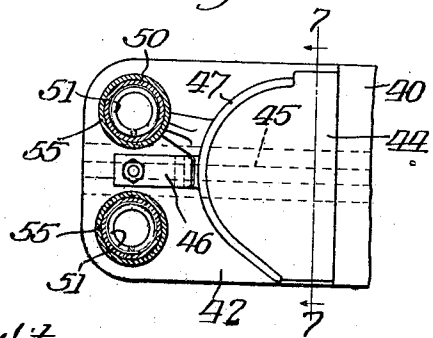
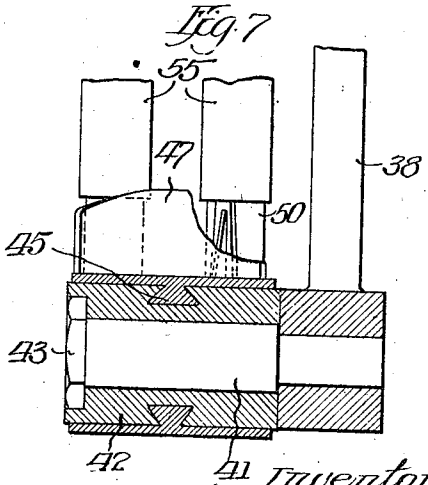


Fig. 7



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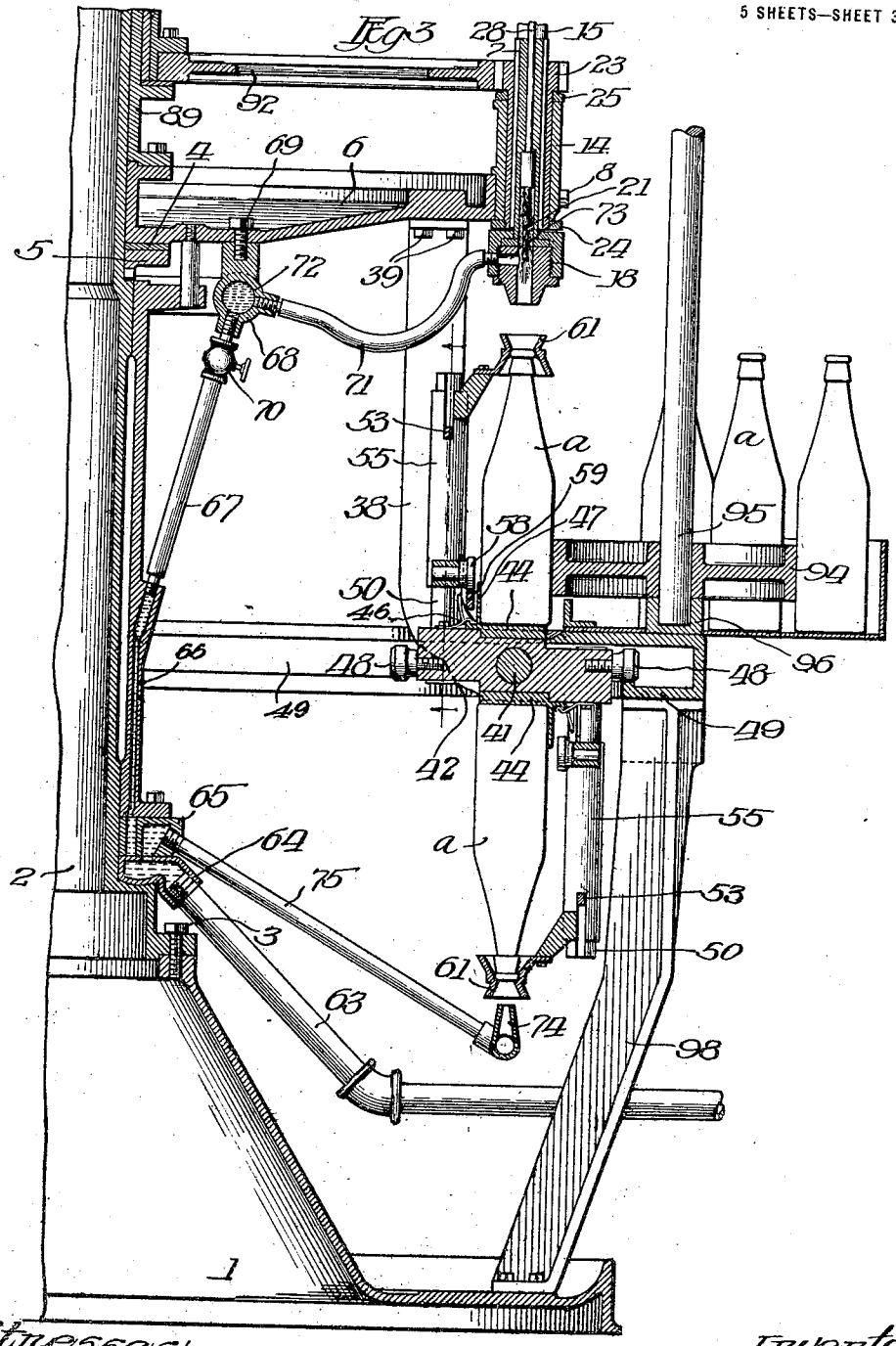

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5 SHEETS—SHEET 4.

Fig 4

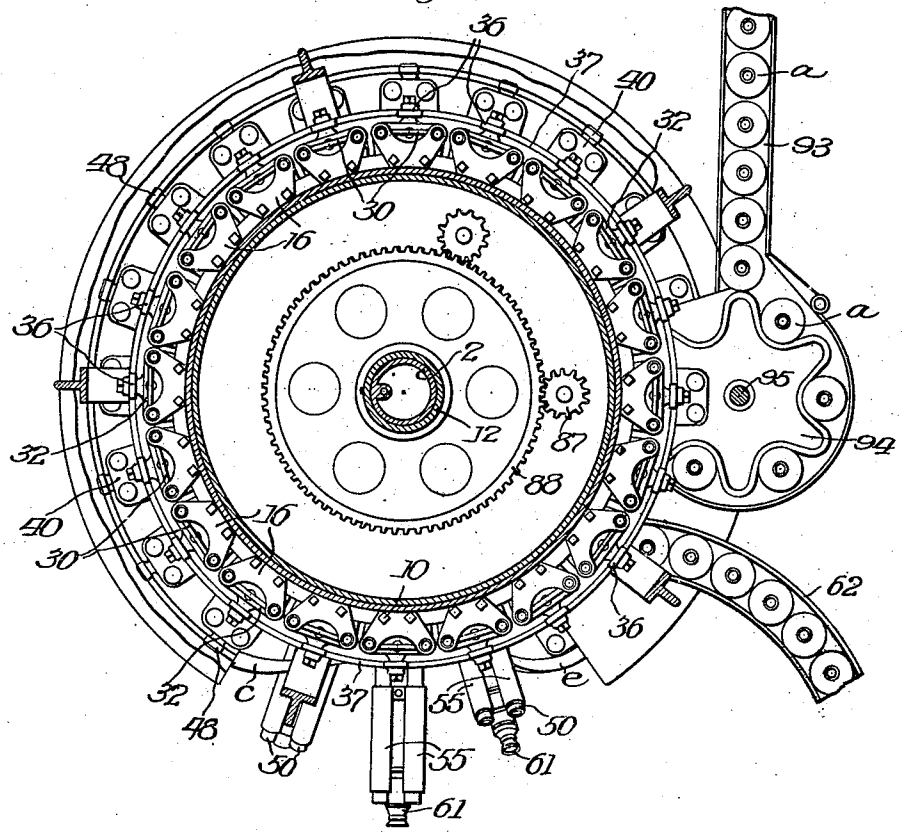


Fig 6

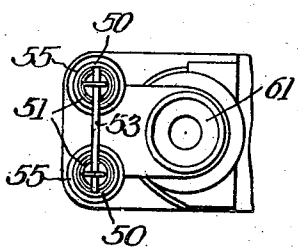
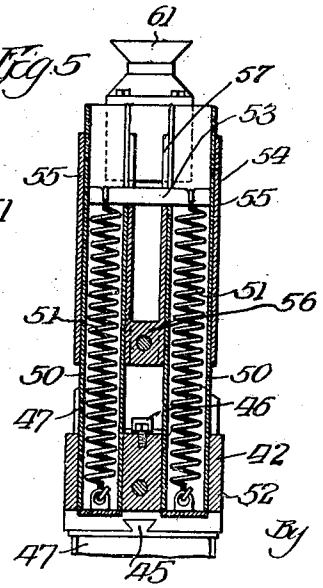


Fig 5



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5 SHEETS—SHEET 5.

Fig. 9.

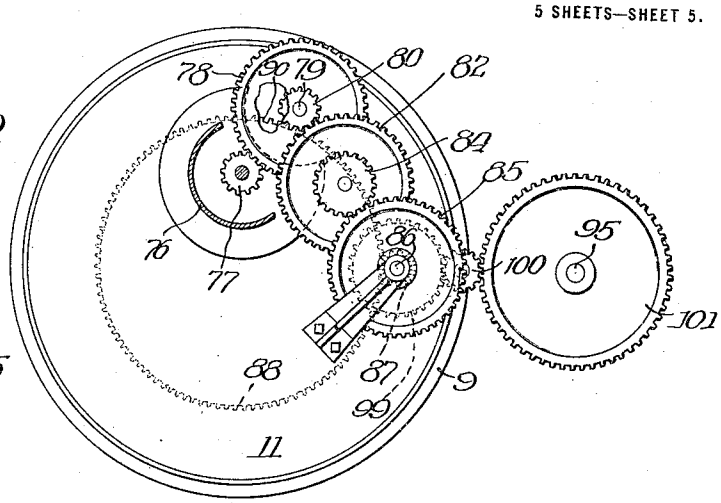


Fig. 14.

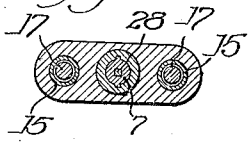


Fig. 10.

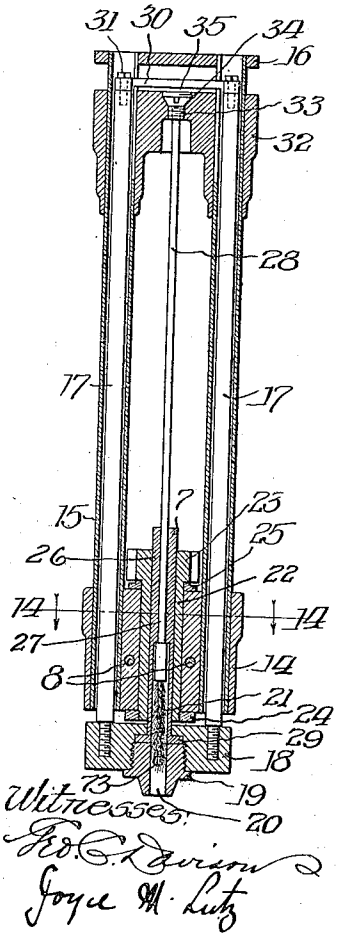


Fig. 11.

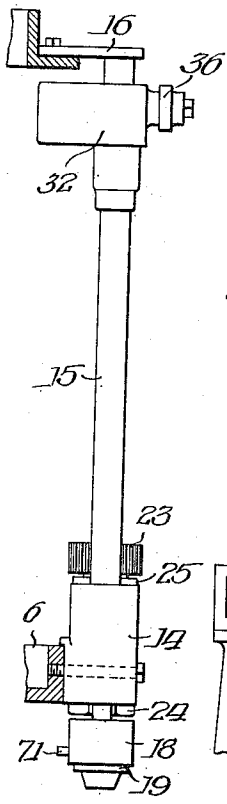


Fig. 12.

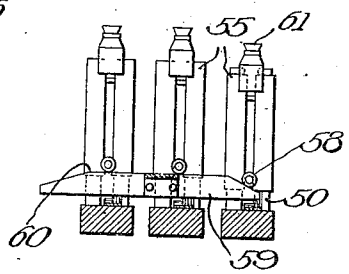
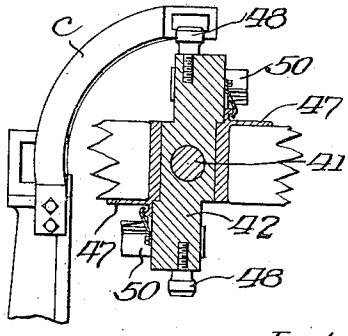


Fig. 13.



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UNITED STATES PATENT OFFICE.

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BOTTLE-HANDLING APPARATUS.

1,244,701. Specification of Letters Patent. Patented Oct. 30, 1917.

Application filed March 26, 1914. Serial No. 827,257.

To all whom it may concern:

Be it known that I, HENRY J. CHILTON, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bottle-Handling Apparatus, of which the following is a specification.

This invention relates to improvements in bottle handling apparatus and refers more particularly to a rotary machine for washing, rinsing and draining or drying bottles.

Among the salient objects of the invention are to provide a machine in which the bottles are automatically fed right side up, and washed in that position, inverted for rinsing, then drained or dried, and then restored to their original upright position and then discharged, all of these operations taking place during the rotation of the rotary main frame; to provide a construction of the character referred to in which the water used for washing and rinsing is kept from running over any of the operating mechanisms of the apparatus; to provide in a construction of the character referred to a novel form of turn over mechanism, automatically operated by the rotation of the machine; to provide in connection with said latter mechanism, automatically actuated clamping mechanism for holding the bottles in the holders while the former are being washed, rinsed and drained including means for automatically releasing the bottles from the holders at predetermined points in their travel; to provide means for automatically regulating the supply of water to the brushes during their travel with the main frame, to provide a construction which is adapted for receiving bottles of various sizes and specifically bottles provided with patent stoppers secured to the necks, the machine being adapted for the last mentioned bottles by reason of the fact that the bottles are washed right side up so that the locking mechanism will not fall into the way of the brushes during the operation of washing; to provide a construction in which the bottles are washed, rinsed and drained on the same rotary main frame in a minimum space, the bottles each rotating twice around the frame, and in general to provide an improved construction of the character referred to.

The invention consists in the matters hereinafter described and more particularly pointed out in the appended claims.

In the drawings—

Figure 1 is a vertical sectional view of my improved bottle handling apparatus parts of the cam track being broken away in order to more clearly show various features of construction;

Fig. 2 is a horizontal sectional view taken on lines 2—2 of Fig. 1 and looking in the direction of the arrows.

Fig. 3 is a fragmentary vertical sectional view taken on an enlarged scale and showing more particularly the turn over mechanism and bottle handling mechanism.

Fig. 4 is a horizontal sectional view taken on lines 4—4 of Fig. 1 and looking in the direction of the arrows.

Fig. 5 is a sectional view showing particularly the clamping mechanism for the bottles.

Fig. 6 is a top plan view of the view shown in Fig. 5.

Fig. 7 is a detail sectional view showing the removable bottle centering devices.

Fig. 8 is a horizontal sectional view of the details shown in Fig. 7.

Fig. 9 is a top plan view showing the driving mechanism for the machine with parts left out for the sake of clearness.

Fig. 10 is a vertical sectional view of one of the washing sets.

Fig. 11 is a view similar to Fig. 10 but taken at right angles thereto.

Fig. 12 is a detail view showing the mechanism for releasing the bottle clamping members.

Fig. 13 is a detail view showing the main turn over cam mechanism.

Fig. 14 is a horizontal sectional detail view taken on lines 14—14 of Fig. 10.

I am aware that heretofore various mechanisms have been devised for washing and rinsing bottles while rotating around a substantially vertical axis, and have myself patented structures of this character.

Referring now to the drawings—1 designates the main base casting on which is mounted a base or standard 2 secured to the casting by cap screws 3. Intermediate the height of the standard 2 is rigidly connected to the latter a collar 5 on which is an anti-friction washer 4, and on this washer

is supported the main rotary frame designated as a whole 6. This frame 6 may take the form of a ring as shown in Fig. 1. Extending circumferentially around this main frame is a series of bottle washing sets each designated as a whole 7. Each of these sets is a unitary structure as shown more clearly in Figs. 10 and 11. Each set is secured to the main frame 6 by means of screws 8 as shown more clearly in Fig. 1. To the top of each washing set is secured a common ring 9 by means of screws 10. The ring 9 which is right angled in cross section is loosely mounted around the stationary top plate 11, which plate is provided with a boss 12 fitting over the top of the standard 2 and secured thereto by screws 13.

Describing now one of these bottle washing sets, a head 14 is rigidly bolted to the rotary main frame, and is apertured to receive tubes 15 which are driven into the head and form guide members. The upper ends of these tubes 15 are connected by means of a cross arm 16. Within each of these tubes 15 is slidably mounted a rod 17, the lower end of which is screw threaded into a head 18. Into this head in turn is screw threaded the upper bottle centering member 19 which is apertured at 20 to receive the brush 21. The stationary head 14 is apertured to receive a sleeve 22 carrying a gear 23, the sleeve being held against vertical movement by a nut 24, but rotating in the head. Between the gear and head is interposed a washer 25. Within the sleeve 22 and splined thereto is a second sleeve 26. This sleeve 26 is provided with a squared aperture 27 to receive the brush spindle 28. The lower end of the sleeve is circular in cross section to receive the brush. The lower end of the sleeve 26 has a flange 29 fitting into the head 18, clearly shown in Figs. 10 and 11. The upper ends of the rods 17 are connected by means of a cross piece 30 and screws 31. On the tubes 15 is mounted a cross head 32. The upper end of each brush spindle 28 is threaded as shown at 33 into a thimble 34 rotatably seated in the cross head 32. The thimble 34 is secured against vertical movement by means of a nut 35. On the cross head 32 is mounted a cam roller 36. Each of the rollers of these washing sets rotates on a stationary cam track 37 which extends around the rotary main frame.

Describing now the bottle holding sets and associated mechanisms, to the rotary main frame 6 is secured a series of depending arms 38 by means of screws 39. The lower end of each arm 38 is provided with a curved extension 40 on which is rigidly mounted a stub shaft 41. Journaled on this stub shaft 41 is the base of the corresponding turn over set. The base 42 is secured against endwise displacement from the shaft by a nut 43. On each of the bases 42 is mounted a pair of oppositely disposed bottle holder members 44. These bottle holders are detachably held into the base of the turn over mechanism by dove-tail connection 45 and the spring clip 46. Each bottle holder has a curved centering back 47. On the opposite ends of each turn over base are journaled rollers 48 which coöperate with a cam track 49 hereinafter described.

Referring now to the manner of clamping bottles in the holders, on each base 42 is rigidly mounted a pair of tubular posts 50; in each of these posts is a coiled tension spring 51. The springs are secured at their lower ends as shown at 52 to the posts and connected at their upper ends by a cross bar 53. Telescoping over these posts is a cross head 54 which comprises a pair of sleeves 55 connected as shown at 56 and slotted as shown at 57, to receive the cross bar 53. The lower end of each cross head is provided with a cam roller 58 which rides on a stationary cam track 59. The cross head is normally pulled down by the springs and is positively raised when the roller rides on the elevated portion 60 of the cam track 59. The upper end of each cross head carries a bell-shaped bottle centering member 61. The arrangement of the mechanism just described is such that after the bottles have entered the holders (the points *a* designating the position of the bottles at certain points in their travel on the frame), the cam rollers ride off the cam track 59, and the springs 51 pull the bottle centering member into engagement with the necks of the bottles. The bottles are released at the point of discharge *b* because at this point the cam rollers ride upon the portion 60 of the cam track 59, and raise the bottle centering member out of engagement with these bottles. The bottles are deflected by means of a deflector plate 62.

The arrangement of the turn over mechanism is such that each bottle will travel part way around the machine in upright position and then be automatically inverted while still in the holder. The bottle then travels again around the machine in inverted position when it is again restored to its upright position and automatically shunted from its holder. This is accomplished as follows. It will be remembered that the turn over base members 42 are rotatably journaled on the stub shafts 41. The then outer rollers 48 ride on the cam track 49, the then inner rollers being idle. When the rollers which are then riding on the cam track reach the point *c* on the cam track they are deflected by reason of the cam track being bent as shown in the drawings. The outer rollers continue to engage the track until it reaches the point marked *d*. At this point, the opposite roller engages the portion *e* of the track, to complete the one-

half turn of the turn over base, and the bottle which was formerly in upright position is now in inverted position. It is obvious that the other bottles upon the turn over which were in inverted position, are now in upright position.

Describing now the manner of the brushes entering the bottles, as the cam rollers 36 ride on the cam track 37 they permit the cross head 32 to descend by gravity and this in turn allows the rod 17 to descend by gravity. The centering member 20 carried by the head 18 is then allowed to move downwardly into engagement with the upper bottle centering member 61. The brush spindle however, is free to still further descend by gravity and accordingly enters the bottle. During the time that the cam roller 36 rides on the lower part of the cam track, the brush remains in the bottle, and is raised out of the bottle by action of the cam mechanism until it clears the bottle at a point before the turn over mechanism operates.

Referring now to the manner of supplying water to the brushes, a supply pipe 63 delivers water to a valve chamber 64 provided with a rotary valve 65 all in a well known manner. Water is delivered from the rotary valve through a conduit 66 to a flexible hose 67 which in turn is connected to an annular water ring 68 extending around the machine. This water ring is supported on the rotary main frame as shown at 69. A valve 70 is interposed in the flexible hose 67. Water is taken from the water ring by means of a plurality of flexible tubes 71, there being one for each brush member. The water ring is also provided with an escape opening 72. Each tube or hose 71 communicates with the brush through apertures 73. The arrangement is such that when the brushes are in the position shown in Fig. 3 no water will pass out through the hose 71 into the brush as the outlet end of the opening 73 is higher than the over-flow ring 72. When the brushes are lowered water will run into them by gravity. It is further to be noted that in the construction described it is not necessary for the water to pass through the brush spindle as has heretofore been common. The bottles are rinsed by means of rinsers 74 connected to the rotary valve 65 by pipes 75. The arrangement is such that the water is supplied to the bottles for rinsing at predetermined intervals all in a well known manner.

Describing now the manner for driving the various parts, on the top plate 11 is mounted a motor designated as a whole 76. On the armature shaft of this motor is mounted a pinion 77 which meshes with a gear 78 in turn journaled on a shaft 79. On the upper portion of this same shaft 79 is a similar pinion 80, and on the lower portion of the shaft is a similar pinion 81. The pinion 80 meshes with a gear 82 loosely mounted on a stub shaft 83, and this gear 82 carries a pinion 84 which in turn meshes with a gear 85, the gear 85 being mounted on a shaft 86. On the other end of this shaft is mounted a pinion 87, the pinion 87 driving the gear 88, which gear 88 is splined to a sleeve 89. At its lower end this sleeve 89 is fixed to the main frame. The driving mechanism just described rotates the main frame.

Describing now the mechanism for rotating the brush spindles, the pinion 81 heretofore described meshes with a gear 90 which has a sleeve extension 91 which extension carries at its lower end a relatively large gear 92. This gear 92 drives the various pinions 23 of the brush spindles.

Referring now to the manner of feeding bottles to the holders, bottles are first passed through a chute 93 and ride around a star wheel 94. This wheel 94 is secured to a shaft 95 which is journaled at its lower end in a bearing 96 carried on the upper surface of the cam track 49 and at its upper end is journaled in a bearing 97 secured to the top plate 11. It may be here noted that this cam track 49 is mounted on posts 98 supported from the base casting. The shaft 95 is driven as follows—on the shaft 86 is mounted a gear 99 which meshes with a gear 100 which in turn drives gear 101 carried by the shaft.

The operation of the machine will be apparent from the foregoing description and need not be described in detail. It is to be noted however, that bottles are delivered to the machine right side up, travel part way around the machine in this position and in this position are washed, the brushes are then withdrawn from the bottles, the bottles inverted and then rinsed. After the bottles have been rinsed they continue their travel around the machine in inverted position during which time they are being drained. When they reach the turn over part of the cam mechanism they are inverted and are then discharged from the holders. It is to be of course understood that after the machine has made one revolution there will be bottles in both the upper and lower holders of each turn over set. All of these operations take place automatically and at properly timed intervals during the rotation of the rotary main frame. The operation of the brushes as well as the water supply to the brushes and rinsers is also automatically controlled.

In its broad aspects the invention is not limited to the details of mechanism except in so far as the same may be set forth in the appended claims.

I claim as my invention:

1. In a bottle handling apparatus, the

combination with a rotary main frame rotating around a substantially vertical axis, of bottle carrying mechanism, mechanism for washing bottles in substantially upright position during their travel with the main frame, and mechanism mounted on said main frame for inverting the bottles and rinsing them while in inverted position, said mechanisms operating automatically in timed relation.

2. In a bottle handling apparatus, the combination with a rotary continuously rotating main frame, provided with a plurality of bottle holders, of mechanism for washing bottles while in substantially upright position during their rotation with the main frame, mechanism carried by said main frame for inverting and rinsing bottles while in inverted position during their rotation with said frame and means for actuating said parts in properly timed relation.

3. In a bottle handling apparatus, the combination with a rotary main frame rotating around a substantially vertical axis, of a plurality of turn over sets mounted thereon, and each provided with a pair of oppositely disposed bottle holders, mechanism carried by said rotary frame for inverting the bottle holders at predetermined points in their travel with the main frame and mechanism for treating bottles while in said holders.

4. In a bottle handling apparatus, the combination with a rotary main frame rotating around a substantially vertical axis, of washing mechanism traveling therewith, of rinsing mechanism associated therewith, mechanism carried by said main frame for supporting the bottles in upright position while being washed, mechanism carried by said main frame for supporting bottles in inverted position while being rinsed and mechanism for actuating said parts in properly timed relation.

5. In a bottle handling apparatus, the combination with a rotary main frame, of a plurality of turn over members carried by said frame and each provided with a pair of oppositely disposed bottle holders, mechanism for washing the bottles while in substantially upright position in the holders, mechanism for rinsing the bottles while inverted in said holders and mechanism for rotating said turn over mechanism at predetermined intervals in the travel of the main frame and means for actuating said various mechanisms in timed relation.

6. In a bottle washing apparatus, the combination with a rotary main frame, of a plurality of turnover members carried by said frame and each provided with a pair of oppositely disposed bottle holders, mechanism for washing the bottles in substantially upright position in the holders, and mechanism for rinsing the bottles while inverted in said holders, said bottle washing and rinsing mechanism being substantially in axial alinement.

7. In a bottle washing apparatus, the combination with a main frame, of a water supply chamber therefor, means for feeding water to the chamber, means for feeding the water from the chamber to bottles by gravity, said gravity feed comprising a movable tube, and means for alternately raising the delivery end of the tube above and lowering it below the level of the inlet end.

8. In a bottle washing apparatus, the combination with a rotary main frame, of a plurality of bottle holding mechanisms each comprising a pair of oppositely disposed invertible bottle holders, mechanism for washing the bottles while in substantially upright position and mechanism for rinsing the bottles in their inverted position, said bottle holders being arranged between said washing and rinsing mechanisms.

9. In a bottle washing apparatus, the combination with a rotary main frame, rotating around a substantially vertical axis, of a plurality of washing mechanisms traveling on said rotary frame and a plurality of turnover members each provided with a pair of oppositely disposed bottle holders, said turnover members being also carried by said rotary main frame.

10. In a bottle washing apparatus, the combination with a rotary main frame rotating around a substantially vertical axis, of a plurality of turnover sets mounted thereon and each provided with a pair of oppositely disposed bottle holders, mechanism for inverting the bottle holders, and means for actuating said inverting mechanism so that the bottle will travel substantially around the frame both in its upright and inverted position.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."