June 11, 1929. G. E. STRANDT ET AL 1,716,869

BOTTLE FILLING MACHINE

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Fig. 1.

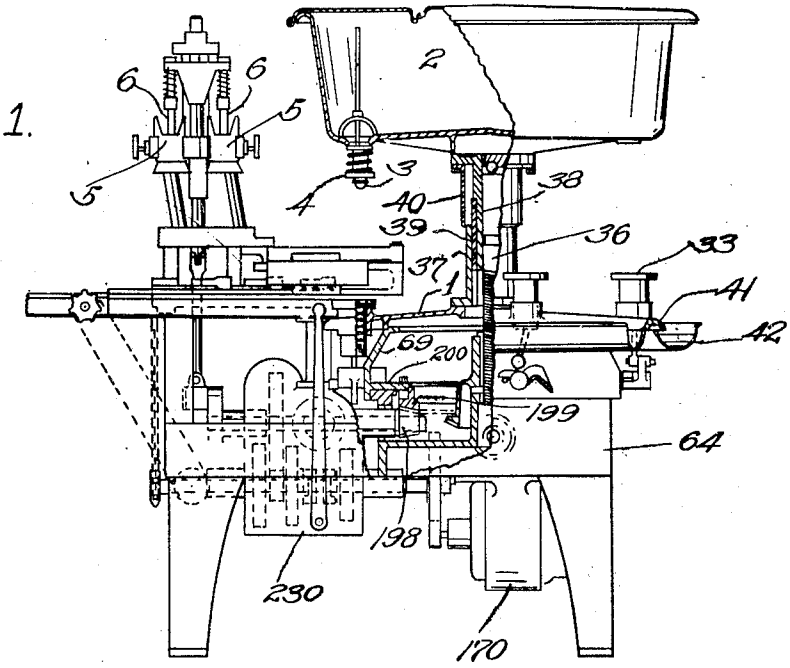
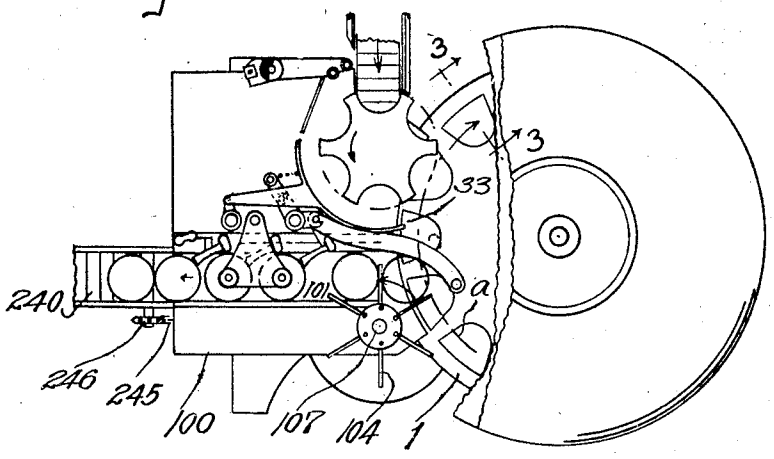


Fig. 2.



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Fig. 3.

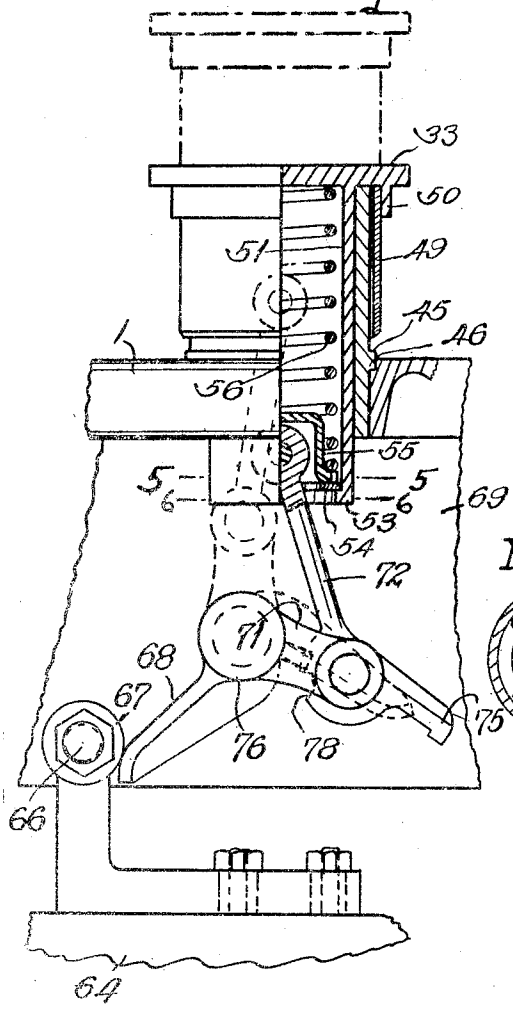


Fig. 4.

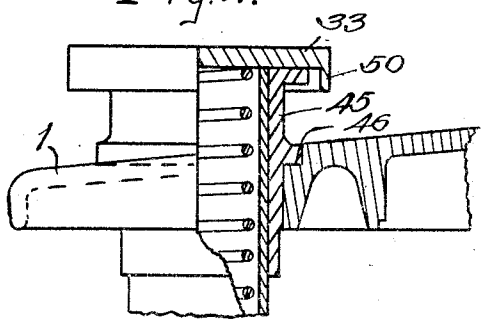


Fig. 5.

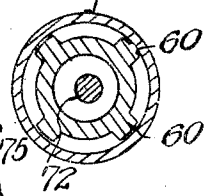
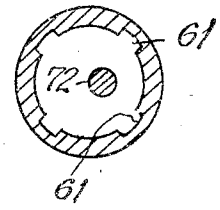


Fig. 6.



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Fig. 7.

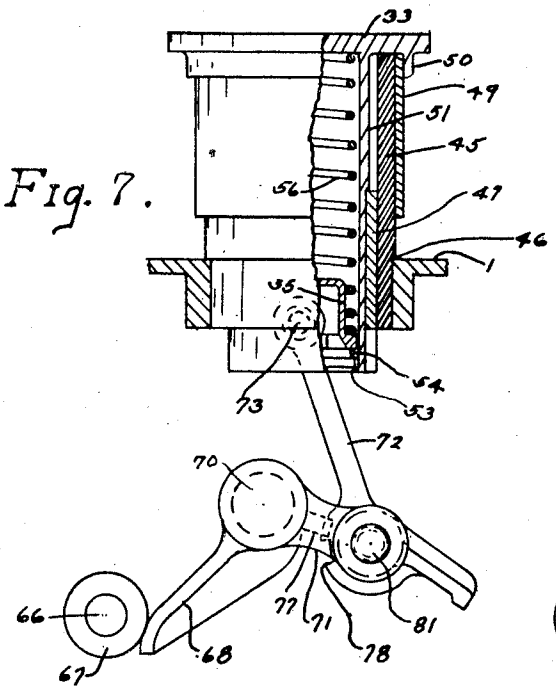


Fig. 8.

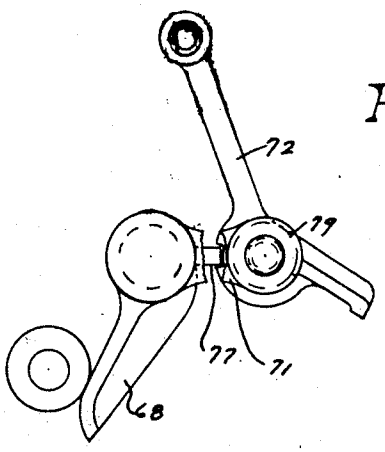


Fig. 9.

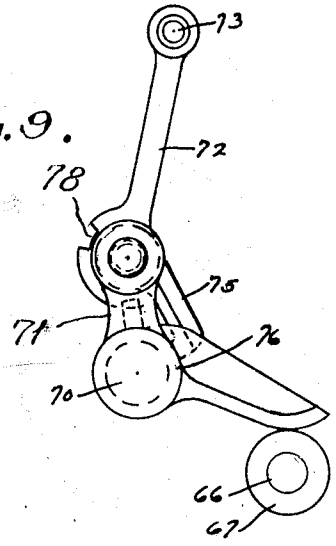
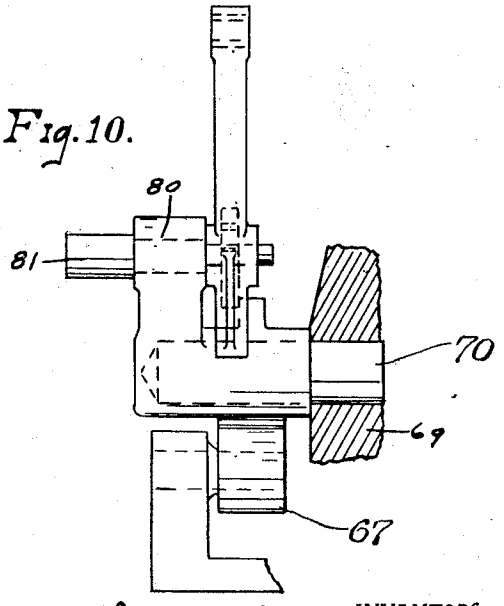


Fig. 10.



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Fig. 11.

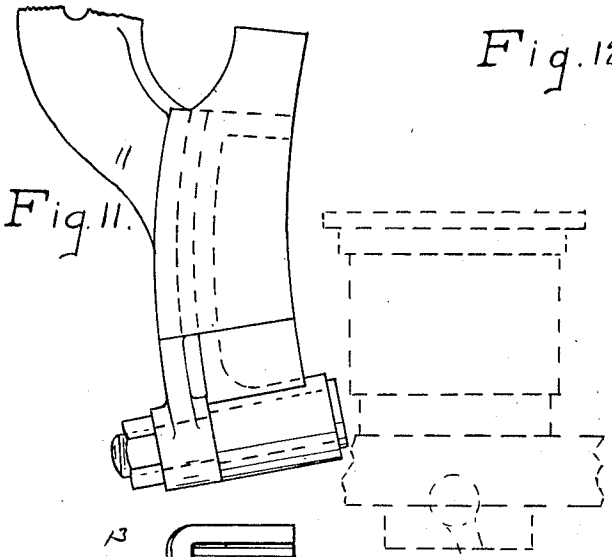


Fig. 12.

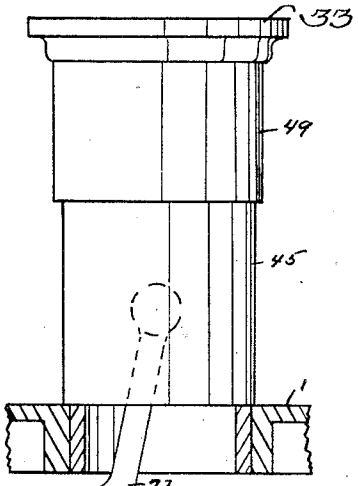


Fig. 13.

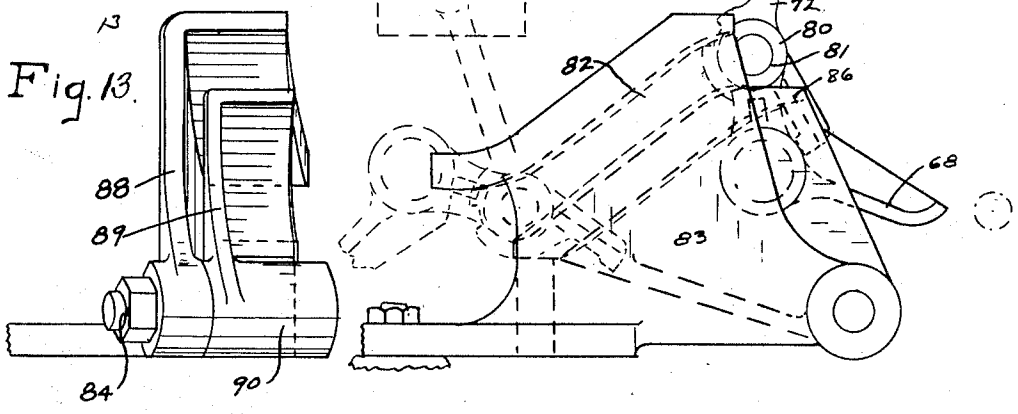
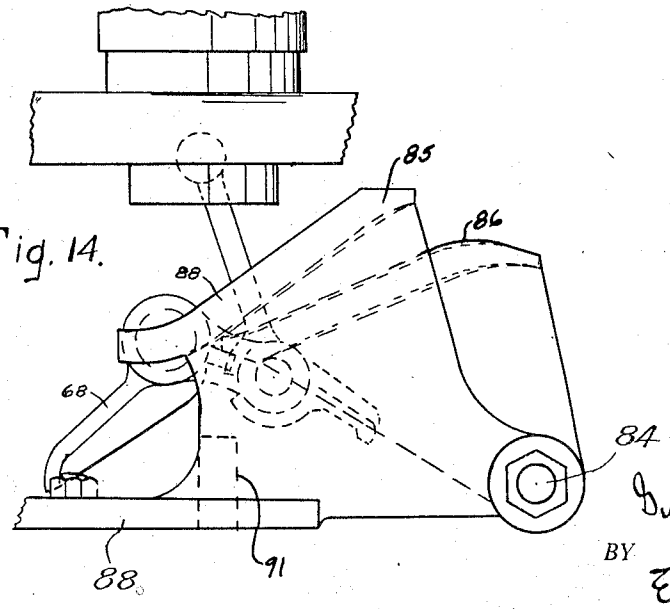


Fig. 14.



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UNITED STATES PATENT OFFICE.

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BOTTLE-FILLING MACHINE.

Application filed July 30, 1923. Serial No. 654,652.

Our invention relates to improvements in bottling and capping machines, with particular reference to the filling of milk bottles.

The primary object of this invention is to provide improved means for filling bottles in a continuous operation.

More particularly stated, objects of this invention are to provide an improved turn-table having simplified bottle supports for conveying and adjusting the bottles into and out of milk receiving relation to the filler nozzles; to provide improved mechanism for raising and lowering the bottle holders, either automatically or manually, while the turn-table is in motion; to provide means to facilitate perfect sanitation of the bottle holders; to provide means for raising empty bottles into engagement with the nozzles and lowering the filled bottles without shock; to provide means for automatically controlling the downward movement of the bottles during the lowering operation; to provide an improved sanitary automatic filler which will be subject to manual control without danger of interference with the operation of automatically acting devices.

In the drawings:

Figure 1 is a side elevation of our improved machine with portions broken away in vertical section.

Figure 2 is a plan view, also partially broken away and the capper removed, except for its top plate which is retained to show its location.

Figure 3 is a detail view on line 3—3 of Figure 2, partly in section, of the lifter mechanism and an associated bottle support, a fragment of the turn-table being also shown.

Figure 4 is a similar view of the bottle support and a portion of the turn-table, showing a slightly modified form of construction.

Figure 5 is a sectional view of the base of the coupling 55 drawn on line 5—5 of Figure 3.

Figure 6 is a sectional view drawn on line 6—6 of Figure 3.

Figures 7, 8 and 9 are detail views of the lifter mechanism in progressive stages of a lifting operation, an associated bottle holder being shown, partly in section, in Figure 7.

Figure 10 is a view of said lifter mechanism when viewed in the direction of turn-table travel.

Figure 11 is a plan view of the lowering guide.

Figure 12 is a front elevation of the same, showing also a bottle support and associated lowering mechanism initially engaging the guide.

Figure 13 is a detail view of the guide, viewed in the direction of turn-table movement.

Figure 14 is a front elevation of the guide and associated bottle holder, showing the traverse of the lowering stud or roller through the guide after the bottle holder has been manually lowered, to remove a defective or misplaced bottle.

Like parts are identified by the same reference characters throughout the several views.

The general organization of our improved machine conforms to established practice. The empty bottles are delivered to supports carried by a rotary turn-table 1 (Figures 1 and 2) underneath a milk container 2 having resiliently yielding, valve outlet nozzles 3 against which bottles may be forced from beneath, the nozzles having valve controlling cap members 4, each adapted to cover the mouth of a bottle. When the bottle is lifted to receive a nozzle, it engages and lifts one of these cap members to open the valve and allow milk from the container 2 to flow into the bottle. The subsequent downward movement of the bottle will allow the valve to close, pending the adjustment of another empty bottle in lifting relation to that nozzle and its cap 4. These parts may be of ordinary construction and further description is therefore deemed unnecessary.

The turn-table 1 and the container 2 rotate in unison. After the bottles have been filled, they are delivered from the turn-table to a capping mechanism having reciprocatory capping devices 5, each of which is adapted to engage the mouth of the bottle and force a cap into position therein by means of a plunger, the shank 6 of which is illustrated in Figure 1, which shows two capping members and their respective plunger shanks. Except as hereinafter described, these general features may be assumed to be common to

machines of the type to which this invention relates.

The turn-table and associated parts.

The turn-table is slightly conical in form. The filler tank 2 is adjustably supported above the turn-table by a central screw 36 which passes through tubular telescoping sections 37 and 38 which are in sliding key connection at 39 to prevent relative rotation. The hood 40 telescopes over the section 37 and protects the interior from the milk. The outer margin of the turn-table is downturned, as indicated at 41, and constitutes a drip margin adapted to deliver any milk splashed upon the turn-table into a trough 42.

The bottle supports or supporting plates 33 are mounted upon tubular posts 45, socketed in turn-table apertures and having shoulders 46 adapted to rest on the turn-table, whereby these posts may be supported within the turn-table apertures. The bottle supports 33 are each provided with a depending annular flange 50 exterior to the post and an interior telescoping tube 51 which extends downwardly through the post and is provided with an internal shoulder at 53 which supports a ring 54 upon which a connecting rod coupling 55 is loosely mounted, this coupling being also adapted to serve as a seating for a spring 56 interposed between the base flange of the coupling and the top of the bottle support within the tubular member 51. A key 47, mounted in an internal channel extending vertically of the post 45, anchors the tubular member 51 and the bottle support 33 against rotation. An exterior sleeve 49 is preferably connected with the flange 50 of the bottle support, whereby, when the bottle support is lifted, the space between it and the top of the post 45 will be covered by this flange 49, thereby protecting the interior from splashing milk. The construction permits of the ready removal of the supports 33 for replacement.

The base flange of the coupling is provided with projections 60, as shown in Figure 5. The internal flange 53 is provided with corresponding notches 61 through which these projections may pass when the collar or annulus 54 is removed. By pressing the coupling 55 upwardly in the sleeve 51, the collar or annulus 54 may be tilted until its peripheral margin may be passed through the notches 61, whereby it may be withdrawn. The coupling 55 may then be adjusted with its projections 60 in registry with the notches 61, whereupon it may also be withdrawn. The bottle support 33 may then be removed from the post and cleansed. To facilitate the separation of the parts as above described, and also to permit the actuating parts to be readily removed and cleansed, I provide the hub of the actuating arm 68 with a socket to loosely receive the pin 70, the hub being removable laterally. To prevent accidental removal, I provide the hub with a projecting pin 77 which loosely engages in a channel or guideway formed in the lower hub of the connecting rod 72. This hub is provided with a notch at 78 and when the parts are in the position in which they are shown in Figure 11, the pin 77 may be withdrawn laterally through this notch. The crank pin may be simultaneously withdrawn from the hub 79 of the connecting rod 72. It will be understood that the actuating arm 68, with its hub and the crank 71, are thus removable as one unit when swung to the Figure 11 position.

The frame 64 is provided with an outwardly projecting stud 66 which carries a roller 67 in the path of an actuating arm 68 pivoted to the skirting 69 of the turn-table by means of a projecting stud 70. The arm 68 is associated with a crank 71 linked to the coupling 55 by a connecting rod 72. After a bottle has been placed by the infeeding star wheel on a support 33 carried by the turn-table, the advancing movement of the turn-table brings the actuating arm 68 into contact with the stationary roller 67, whereupon the arm 68 is forced backwardly and upwardly to the dotted line position indicated in Figure 3 and full lines in Figure 12. In this position, the arm will clear the roller 67. The crank 71 will have been swung to the position in which it is shown by dotted lines in Figure 3 and the bottle holder 33 will have been lifted, as also indicated by dotted lines. The crank will have passed slightly beyond a line through the center of stud 70 and the pivotal axis 73 of the connection with the coupling 55, but further motion in that direction will be prevented by the arm 75 on connecting rod 72 engaging the hub 76 of the crank 71. The reaction of spring 56 will then tend to hold the crank in the raised position.

When the bottle support 33 is thus lifted, the mouth of the bottle is pressed against the cap 4 (Figure 1). The nozzle 3 will have entered the mouth of the bottle, and the cap 4, with the nozzle, will have been lifted to open the nozzle valve and allow milk to flow into the bottle. The cap prevents the bottle from overflowing and it is also utilized to center the bottle. The operation of the cap and the valve are well known in the art and are therefore not illustrated or described in detail.

After a bottle has been lifted to a filling position, as above described, it remains in that position until the movement of the turn-table brings it to the outfeeding side of the machine. The crank pin 80 is extended and provided with a bearing member 81 which enters a channel 82 in a lowering guide bracket 83. This lowering guide bracket is provided with upper and lower inwardly projecting bearing flanges 85 and 86 respectively, the lower flange

86 being pivotally connected with the supporting stud 84. If the crank is in its raised position, member 81 passes over the receiving end of the flange 86 and engages the under surface, or bearing surface, of the flange 85. The initial effect of engagement with the flange 85 is to press the crank pin 80 backwardly across the vertical center line through the stud 70. Thereupon, the weight of the parts, assisted by the reaction of spring 56, tends to swing the crank downwardly to the full line position of Figure 6. The downward movement, however, is controlled by the flange 86 of the lowering guide bracket 83. The member 81 travels downwardly along the upper surface of the flange 86 until the bottle support 33 has descended to a point where it rests on the upper surface of the tubular post 45, as shown by full lines in Figure 3.

Occasionally a misplaced bottle, or a defective bottle, is removed by an attendant or inspector during the filling operation, or before the bottle reaches the lowering guide. In such case the attendant manually operates the arm 68 to lower the bottle support 33 and remove the bottle. In that event, the associated crank pin 80 with its member 81 will be in position to pass underneath the flange 86, and the member 81 engages the under side of the flange 86 and eventually tilts the flange 86 upwardly at its rear end to the position in which it is illustrated in Figure 14. The flanges 85 and 86 are each supported from the frame by the stud 84 and the supporting webs 88 and 89 respectively. The web 88 is preferably fixed on the stud 84. The web 89 is connected with a bearing sleeve 90 which may oscillate on the stud 84. A frame post or lug 91 limits the downward movement of the rear end of the flange 86 and its supporting web 89. The webs and flanges are curved in correspondence with the curvature of the turntable.

We claim:

1. In a bottle filling machine, the combination with a turntable, of an annular series of vertically movable bottle supports carried by the turntable, a corresponding series of supporting studs also carried by the turntable, bell cranks pivotally mounted on said studs and each having one arm linked to an associated bottle support, and a stationary stud in the path of the other arms of said bell cranks and adapted to actuate the latter successively as the turntable is rotated to swing the linked arms upwardly and slightly across a vertical plane through the associated supporting stud, and means for limiting such swingings movements and a device in the path of said bell cranks for retracting each of them successively in a speed controlled movement.

2. In a bottle feeding machine, the combination with a turntable provided with a socket for a bottle support, a bottle support having a shank mounted to slide vertically in said socket, a toggle mechanism linked to said shank, and a projection supported independently of the turn table and adapted to be engaged by said toggle mechanism at a predetermined point during turntable rotation to actuate the toggle and bottle support to a bottle lifting position, and a relatively fixed guide positioned for a subsequent engagement with the toggle mechanism and provided with inclined surfaces adapted to gradually swing said toggle mechanism in a bottle lowering movement.

3. In a bottle feeding machine, the combination with a turntable provided with a socket for a bottle support, a bottle support having a shank mounted to slide vertically in said socket, a toggle mechanism linked to said shank, and a projection supported independently of the turn table and adapted to be engaged by said toggle mechanism at a predetermined point during turntable rotation to actuate the toggle and bottle support to a bottle lifting position, and a relatively fixed guide positioned for a subsequent engagement with the toggle mechanism and provided with inclined surfaces adapted to gradually swing said toggle mechanism in a bottle lowering movement, said toggle mechanism being provided with a projection at the pivotal axis of the toggle members adapted to loosely engage between said guide members.

4. In a bottle filling machine, the combination with a traveling bottle support, of an associated traveling toggle mechanism including a link connected with the bottle support, a bell crank having one arm pivotally connected with the link and another arm in a depending position, a device in the path of said depending arm adapted to actuate the last mentioned arm to swing the link engaging arm toward a vertical position, and a stop on the link adapted to engage the bell crank when the axis of the link crosses a vertical plane.

5. In a bottle filling machine, the combination with a turntable, of an annular series of vertically movable bottle supports, each having an arcuate outer margin concentric with the axis of the turntable, toggle mechanisms connected with the respective bottle supports and holding them against rotation on their respective axes, means for actuating said toggle mechanisms to raise the bottle supports at a predetermined point in the circle of their rotation, said toggle mechanism being adapted to remain in such position until positively actuated in the opposite direction, and guiding means for positively engaging and moving the toggle mechanism in the opposite direction to gradually lower the bottle supports at another stage of their rotation with the turntable.

6. In a bottle filling machine, the combi-

nation with a turntable, of an annular series of toggle supporting studs carried thereby, a toggle for each of said studs including an arm pivoted to the stud, a bottle support having a link pivotally connected with said arm, a lateral projection located at the pivotal connection between the link and said arm, and a guide having inclined surfaces in the path of said projection and adapted to move it to change the relative positions of the link and arm and correspondingly change the elevation of the bottle support.

7. In a bottle filling machine, the combination with a rotary turn-table provided with an annular series of bottle supports and mechanism for intermittently and successively raising and lowering said supports, of a lowering guide having inclined upper and lower walls in vertically spaced relation adapted to engage a portion of said mechanism within said space to thereby control its movement during lowering operations, the lower wall being yieldable vertically toward the upper wall to thereby allow such portion to pass when the mechanism has been manually lowered before reaching said guide.

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