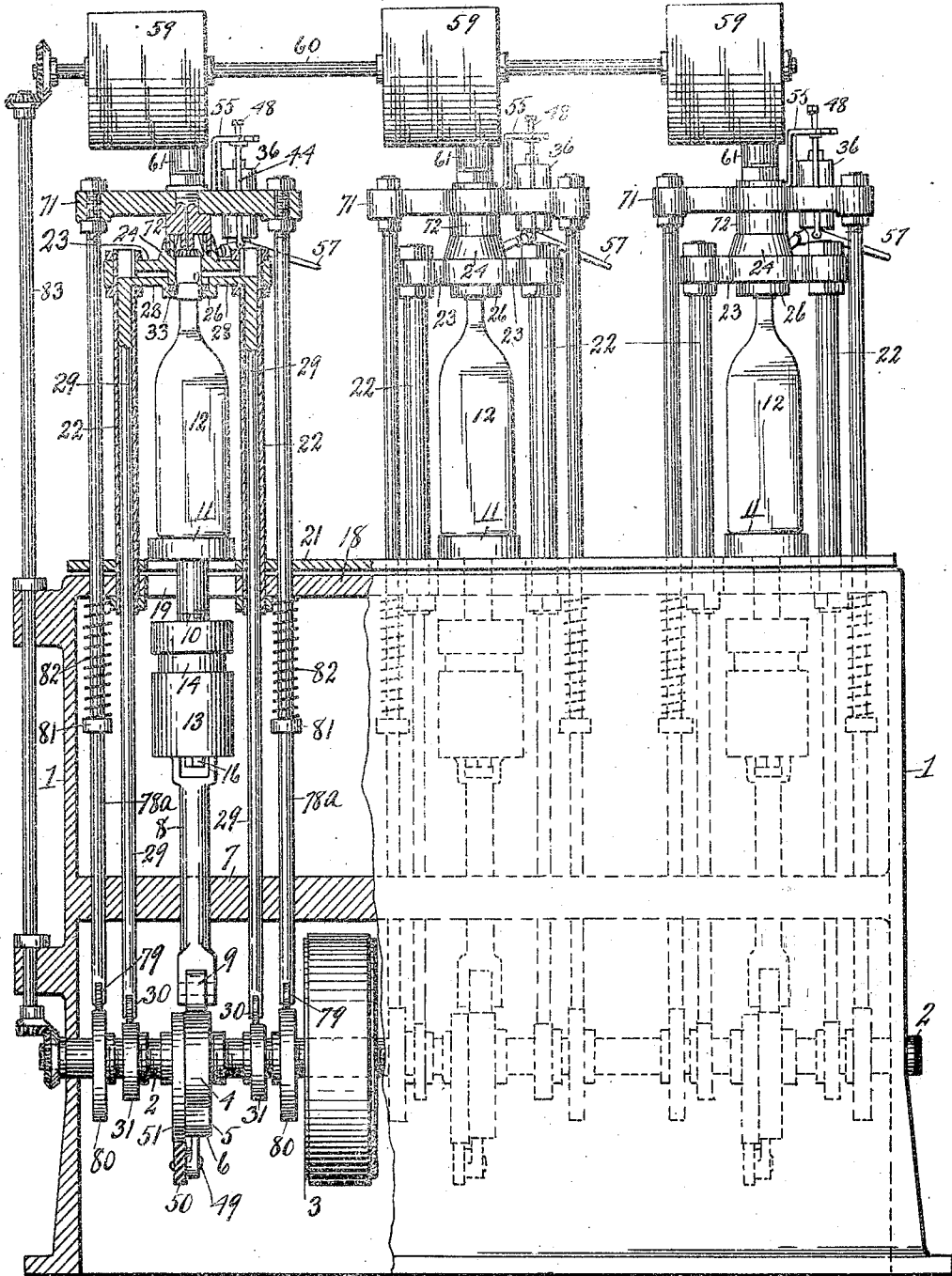


H. A. ALLWARDT.
BOTTLE FILLING AND CROWNING MACHINE.
APPLICATION FILED NOV. 15, 1907.

944,352.

Patented Dec. 28, 1909.

4 SHEETS—SHEET 1.



Witnesses
O. B. Branziger,
J. E. Howlett.

Fig. 1.

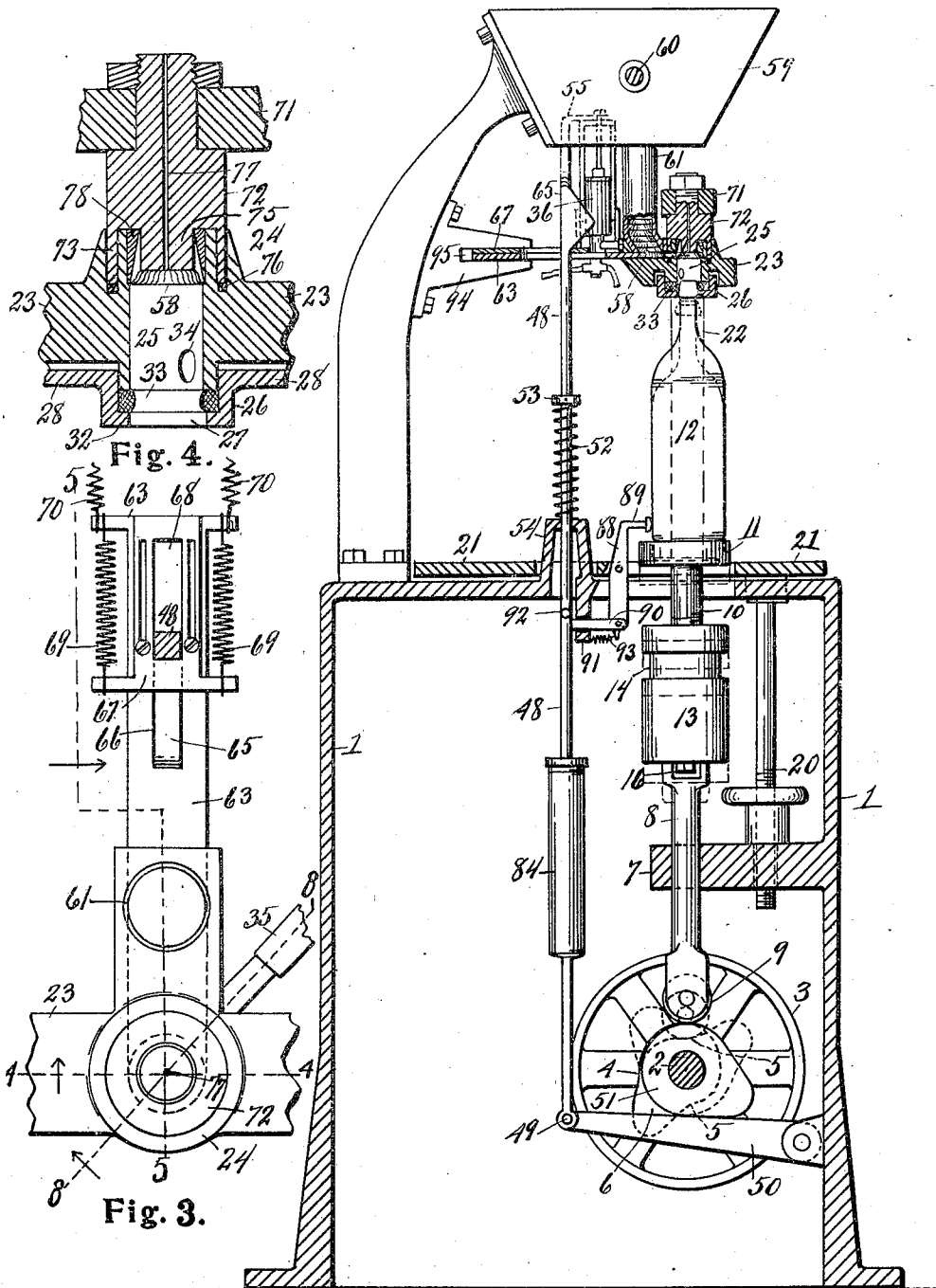
Inventor
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4 SHEETS—SHEET 2.



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Fig. 2.

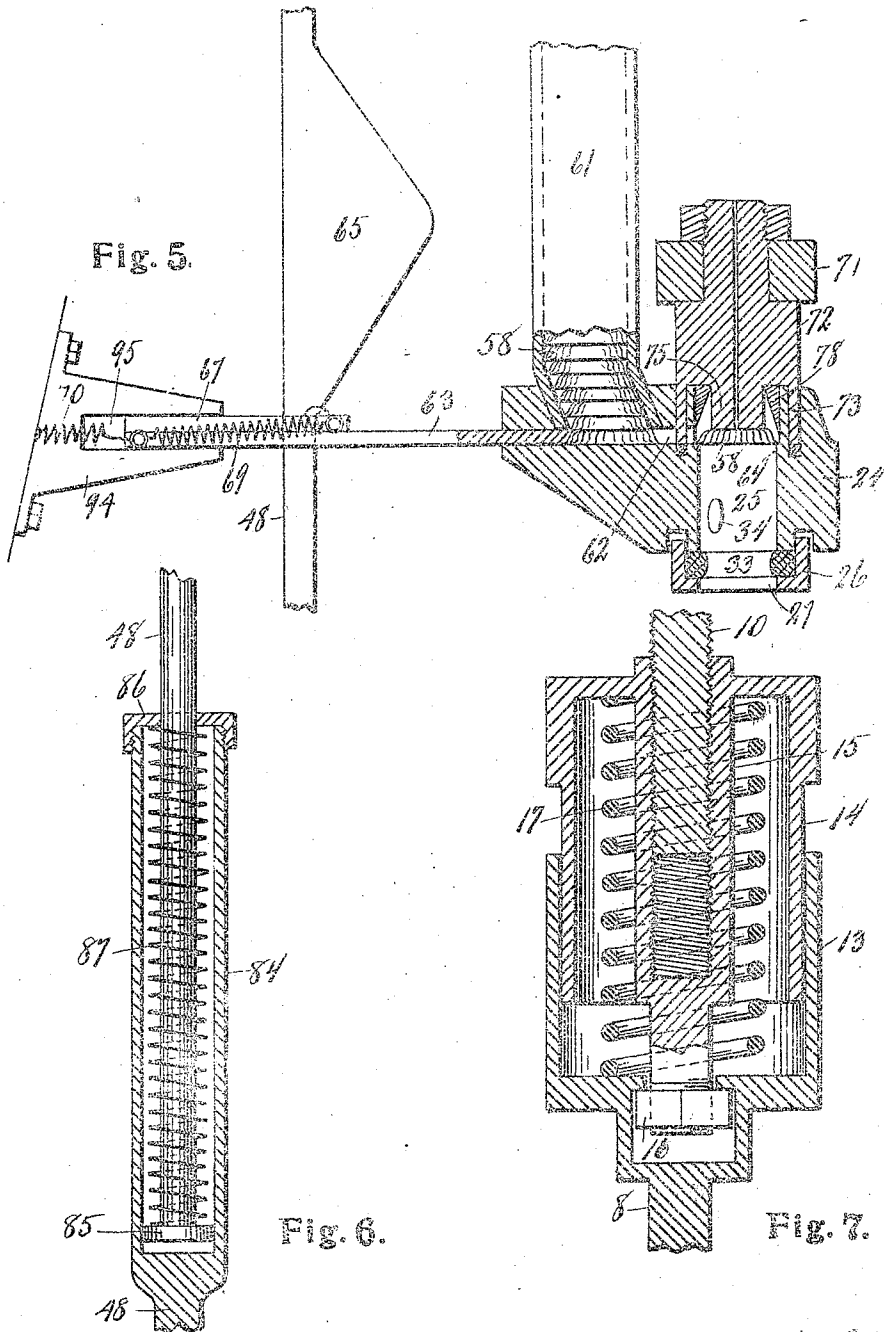
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4 SHEETS—SHEET 4.

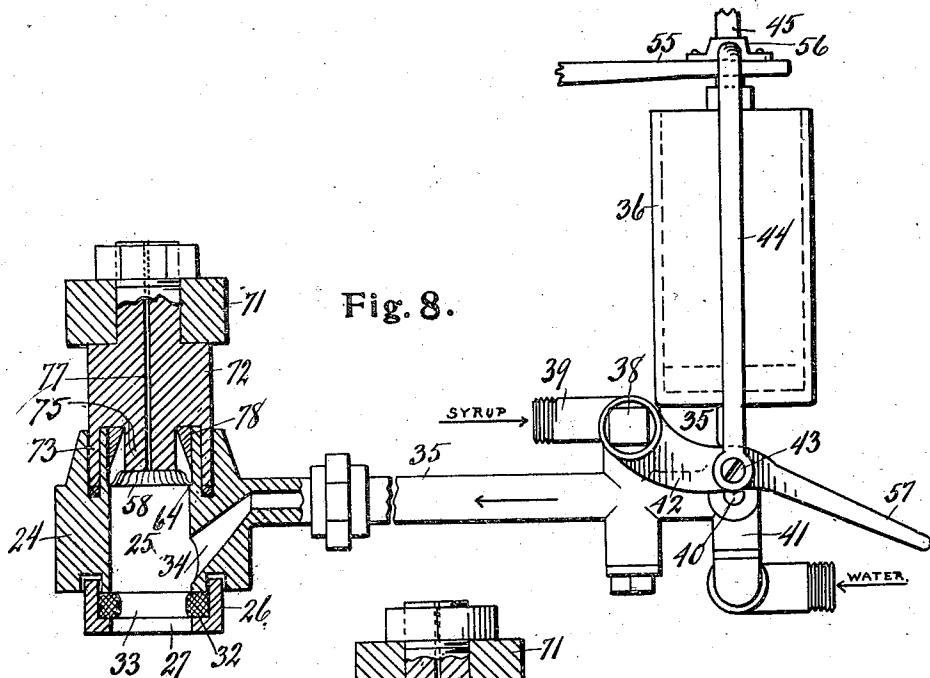


Fig. 8.

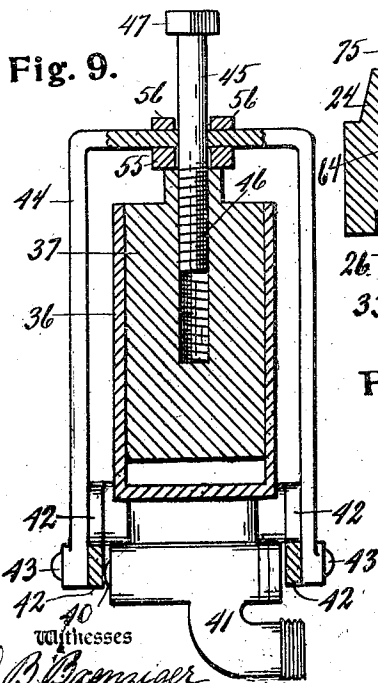


Fig. 9.

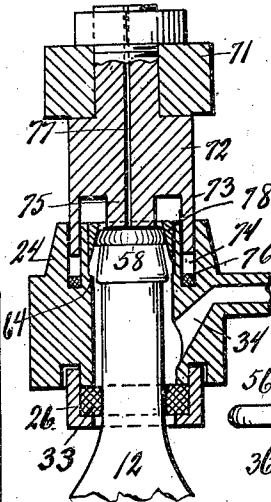


Fig. 11.

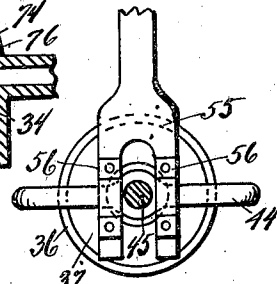


Fig. 10.

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UNITED STATES PATENT OFFICE.

HENRY A. ALLWARDT, OF DETROIT, MICHIGAN, ASSIGNOR OF ONE-HALF TO WILLIAM J. STAPLETON, OF DETROIT, MICHIGAN.

BOTTLE FILLING AND CROWNING MACHINE.

944,352.

Specification of Letters Patent.

Patented Dec. 28, 1909.

Application filed November 15, 1907. Serial No. 402,245

To all whom it may concern:

Be it known that I, HENRY A. ALLWARDT, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Bottle Filling and Crowning Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to bottle filling and crowning machines, especially designed for filling bottles with carbonated beverages, and crowning or sealing the mouth of the bottles after being filled, as hereinafter more fully set forth and pointed out particularly in the claims.

The object of the invention is to provide a machine of comparatively simple and inexpensive construction wherein the arrangement is such as to enable a plurality of bottles to be simultaneously filled and crowned or capped by a single operation of the machine, the arrangements being such as to provide for operating the syrup pump and the valve controlling the water supply; for operating the crown or cap feeding mechanism and for controlling said devices to prevent a feeding of the fluid with which the bottle is to be filled and of the crown with which the bottle is capped, except when a bottle is in a position to be filled and crowned; to prevent foaming and to facilitate the operation of filling and crowning. The above object is attained by the mechanism illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of a machine embodying my invention, a portion of the inclosing case being broken away and a portion of the frame and other parts being in section. Fig. 2 is a vertical section through portions of the machine, other parts appearing in elevation. Fig. 3 is a fragmentary view in plan of the upper portion of the bottle filling and crowning mechanism, showing more particularly the slides employed for feeding the crowns and the reciprocatory slide actuating bar for operating

said slides which bar appears in horizontal section. Fig. 4 is a vertical section as on line 4—4 of Fig. 3. Fig. 5 is a sectional view as on line 5—5 of Fig. 3. Fig. 6 is an enlarged longitudinal section through the expansible joint in the connecting rod that actuates the pump and crown feeding slide. Fig. 7 is an enlarged longitudinal section through the contractible joint in the vertically reciprocatory shaft that presents the bottles to the filling and crowning mechanism. Fig. 8 is a section as on line 8—8 of Fig. 3, the pump and attached parts not shown in Fig. 3, appearing in elevation. Fig. 9 is a vertical section through the pump. Fig. 10 is a plan view of the pump. Fig. 11 is a detail view in section showing the position of the parts when the crown or cap is applied to the mouth of the bottle.

Referring to the characters of reference, 1 designates the frame of the machine which is shown in the form of a casing within which some of the operative parts are located. Crossing the base of the frame or case and suitably journaled therein is the driving shaft 2 carrying a suitable belt pulley 3 through the medium of which said shaft may be revolved.

The machine embodying my invention as illustrated herein is built to handle three bottles at a time; it is evident, however, that it may be constructed to handle any number of bottles desired. As the several sets of operative parts which handle the several bottles are duplicates, I will proceed to describe the operation of the machine with reference to one set only. Upon the main shaft of the machine is a cam 4 having a low point 5 and a high point 6, the remaining portion of the face of said cam being concentric with said shaft. Guided in the cross bar 7 of the frame is a vertically reciprocatory shaft consisting of a lower section 8 having an antifriction roller 9 in its lower end which rolls upon said cam and an upper section 10 having at its upper end a bottle supporting disk 11 adapted to support the bottle 12. On the upper end of section 8 of said shaft is a cylindrical sleeve 13 into which is adapted to fit the open end of an inverted cup 14 (see Fig. 7). Depending within said inverted cup is a hollow stem 15 which is internally threaded and into which is screwed the lower end of the

shaft section 10. The lower end of the stem 15 passes through the bottom of the sleeve 13 and receives the nut 16, whereby the cup and embracing sleeve are secured together.

5 Surrounding the stem 15 within the cup and confined between the closed ends of the cup and sleeve is a compressible spring 17, thereby forming a yielding joint between the sections of said shaft. By means of the

10 threaded portion of the upper section of the shaft screwing into the stem of the cup, said section may be adjusted to accommodate the device to bottles of various lengths. In the top 18 of the frame is an opening 19 for the

15 passage of the upper section of said shaft and the disk 11 carried thereby. Upon the top of the frame and supported by adjusting screws 20 (see Fig. 2) which pass through said top, is a vertically adjustable

20 table 21, also having an opening for the passage of the upper end of said shaft and disk 11, said table being adjustable vertically so that it may be raised and lowered in accordance with the adjustment of the upper

25 section of the vertically reciprocatory shaft. Secured at their lower ends in the top of the frame and projecting vertically therefrom are the supporting tubes 22 which at their upper ends are secured to the lateral

30 arms 23 of the filling and crowning head 24 having therein the central chamber 25 which extends vertically through said head and which is adapted to receive the mouth and neck of the bottle. Embracing the lower

35 end of the head 24 and surrounding the lower opening thereof is a collar 26 having an opening 27 therethrough which registers with the opening of the chamber 25 and provided with laterally extending arms 28

40 which are connected to the upper ends of the vertically reciprocatory rods 29 which pass through and are guided in the supporting tubes 22 and whose lower ends carry the antifriction rollers 30 which roll upon the

45 peripheries of the cams 31 fixed to the shaft 2. Surrounding the lower opening of the chamber 25 in the head 24 and confined between the annular shoulder 32 of the collar 26 and the lower end of said head, is a compressible ring or washer 33, preferably of

50 rubber, which is adapted to make a closure when compressed around the mouth of the bottle during the filling operation, as hereinafter explained. The function of the cams

55 31 is to move the rods upwardly at the proper time and raise the collar 26 to compress the ring or washer 33 and expand it diametrically against the mouth of the bottle.

60 Formed in the wall of the head 24 and communicating with the chamber 25 within said head is a flaring induct port 34 which extends diagonally through the wall of the head and which at its outer end communi-

65 cates with the supply pipe 35 leading to

the pump 36, said pump consisting of a cylinder in which is fitted a suitable piston 37 (see Fig. 9). Communicating with the supply pipe 35 and said pump through a suitable valve 38 is a syrup supply pipe 39

70 leading to a source of syrup supply, not shown. Also communicating with said supply pipe 35 through a suitable valve 40 is a water induct pipe 41. The valve 38 is of the ordinary plug cock type, and connected to the projecting ends of the stem

75 thereof are the levers 42 through the medium of which said valve is actuated. Pivoted at its ends to said levers, as shown at 43, is a bail 44 through the upper horizontal portion of which passes freely a rod 45

80 which is threaded at 46 in the piston 37, whereby said rod is rendered adjustable longitudinally. At the upper end of the rod 45 is a head 47 which is engaged by the

85 bail in its upward movement to impart a corresponding movement to the piston of the pump.

The pump is mechanically actuated through the medium of the vertically reciprocatory rod 48 which at its lower end is

90 pivoted, as shown at 49, to the outer end of the pivoted arm 50 which is engaged by the cam 51 on the shaft 2, the high point of said cam as the shaft revolves being adapted

95 to depress the arm 50 to draw downwardly upon the rod 48, said rod being returned after its downward movement by the spring 52 which is mounted thereon and confined between the collar 53 fixed on said rod

100 and the support 54 through which said rod passes. The upper end of the rod 48 is provided with a forked portion 55 extending at right angles therefrom and embracing the rod 45 of the pump piston below

105 the bail 44 as clearly shown in Figs. 9 and 10. To attach the forked end of the rod 48 to the bail 44 straps 56 are employed which cross said bail and are riveted to the forked ends of said rod. By this arrangement a

110 vertical movement of the rod 48 will impart a corresponding movement to the bail. As the piston rod 45 passes freely through the bail, the stroke which is imparted to the piston by the vertical movement of the

115 bail is determined by the adjustment of the piston rod 45, as the upward movement of the bail does not move the piston until said bail is caused to engage the head 47 of the piston rod, when the piston is carried up-

120 wardly to the limit of the upward movement of the bail. It will therefore be seen that by screwing the piston rod into or out of the piston, the stroke of the piston may be regulated. Upon the end of one of the arms

125 42 is a projecting handle 57 for the purpose of operating the pump manually, when desired.

The metal crowns or caps 58 which are used to close or cap the bottles after being

130

filled, are contained in a hopper 59 and are fed therefrom by suitable means operated by a transverse shaft 60 into a spout 61, the lower end of which communicates with a horizontal channel 62 in the head 24 which in turn communicates with the chamber 25 in said head, as more clearly shown in Fig. 5. For the purpose of feeding the crowns into the chamber 25 from the channel 62 a slide 63 is employed which enters said channel and is adapted by a reciprocatory movement thereof to successively engage the crowns as they feed downwardly in the spout 61 and carry them into the chamber 25, wherein they rest upon an annular shoulder 64 in the wall of said chamber. The slide 63 is actuated by means of the cam plate 65 formed upon the rod 48 which passes through a slot 66 in said plate, as clearly shown in Fig. 3. The slot 66 in the slide 63 is of such length that the cam plate 65 on the rod 48 will not directly actuate said slide by a vertical movement of said rod, movement being imparted to the slide by means of an auxiliary plate 67 mounted thereon and having a slot 68 through which said rod passes, one terminal of which is adapted to be engaged by the cam plate on the rod 48 to reciprocate said plate as said rod is moved vertically. Attached to the forward end of the plate 67 are the coiled springs 69 whose rear ends are attached to the rear ends of the plate 63, whereby as the plate 67 moves forward a corresponding movement is normally imparted to the slide through said springs. Should there be any obstruction in the channel 62, however, which will prevent a movement of the slide 63, the springs 69 yield and permit the plate 67 to move without imparting movement to the slide. Attached to the rear of the slide 63 and connected to a fixed part of the frame are the springs 70 of less tension than the springs 69 to return the slide 63 after it shall have been carried forward to feed a crown into the chamber 25. Upon the return of said slide a succeeding crown drops into the channel 62 in position to be fed into said chamber by the next forward movement of the slide.

Above the fixed head 24 which receives the mouth of the bottle while being filled and crowned, is a movable cross head 71 in which is mounted a head block 72 having a depending annular flange 73 which lies in a circular channel 74 in said head 24 and having an annular depending central portion 75 which is adapted to normally project into the upper end of the chamber 25 and to serve as an abutment to hold the crown in position while the mouth of the bottle is being crowded therinto, which position of parts is clearly illustrated in Figs. 4, 5 and 8. In the base of the channel 74 in the head 24 is a suitable gasket 76 against which the

bottom edge of the flange 73 is adapted to bear to effectually close the upper end of the chamber 25 and prevent the escape of the fluid while the bottle is being filled. To afford a vent for the chamber 25 a vertical aperture 77 is formed through the head block 72. In the upper end of the chamber 25 is a tapered steel ring 78 which is adapted to crimp the crown onto the mouth of the bottle, as hereinafter explained.

Connected with the ends of the cross head 71 are the vertically reciprocatory rods 78^a whose lower ends carry the antifriction rollers 79 that roll in peripheral contact with the cams 80 on the shaft 2. Embracing said rods and confined between the collars 81 thereon and the under face of the top of the frame are the compressible springs 82. The cams serve to raise the rods vertically and the springs 82 return said rods after they have been raised by the operation of the cams.

The horizontal shaft 60 is driven by means of suitable gearing from the vertical shaft 83, said vertical shaft being driven in turn by suitable gearing from the lower main shaft 2.

In the connecting rod 48 is an expansion joint consisting of a cylindrical case 84 in which the upper portion of said rod carrying the annular disk 85 is adapted to lie, as clearly shown in Fig. 6. Confined between said disk and the end 86 of the case is a compressible spring 87.

It will be understood that in the normal operation of the machine, the shaft 2 is driven continuously and the rod 48 is caused to reciprocate vertically for each rotation of said shaft. As the reciprocation of the upper end of said rod will actuate the pump to feed the syrup and water into the filling head, it is necessary to provide some means for preventing such operation in case a bottle is not in position in the machine to be filled and crowned. This result is accomplished by means of a lever 88 (see Fig. 2) which is pivoted in the aperture in the table 21 through which the bottle supporting disk 11 passes and has a horizontally projecting end portion 89 adapted to be engaged by the bottle when properly in position upon said disk. Pivoted to the lower end of the lever 88 is a locking slide 90 supported in and adapted to pass through a guide 91, the free end of said slide standing in proximity to the rod 48 and slightly below the pin 92 projecting from said rod. Attached to the lower end of the lever 88 is a spring 93, the tension of which is normally exerted to project the free end of the slide 90 in the path of the pin 92 on the rod 48 and prevent a downward movement of the upper end or section of said rod. When a bottle is in position upon the supporting disk 11, as shown in Fig. 2, it engages the inwardly extending

arm 89 of the lever 88 and swings said lever on its pivot so as to withdraw the locking slide 90 from the path of the pin 92, thereby permitting a free operation of the crown feeding and pump actuating portion of the rod 48. Should the bottle break when placed in position, or for some other reason should a bottle not be placed upon the supporting disk 11, the spring 93 will project the slide 90 into the path of the pin 92 and lock the upper portion of the actuating rod 48 against movement, the lower portion of said rod carrying the cylinder 84 continuing to operate as the shaft 2 revolves, which movement is permitted by the expansible joint or connection between the upper and lower portions of said rod, and consisting of the cylindrical case 84 and the inclosed spring 87. By this arrangement, in case a bottle is broken, or for some other reason a bottle is not properly placed in position, the operation of the machine is not interfered with while the operation of the pump is prevented, obviating the feeding of a quantity of syrup and fluid except when a bottle is in position to be filled.

In explaining the operation of the machine, it is assumed that the parts are in the initial or first position, as shown by dotted lines in Fig. 2, in which position the anti-friction roller 9, in the end of the shaft 8, lies in the low point 5 of the cam 4, thereby depressing the bottle supporting disk 11 sufficiently to enable a bottle to be placed thereon under the opening 27 in the collar 26. As the shaft 2 revolves the roller 9 rides out of the depression 5 in the cam 4 and raises the shaft 8 so as to carry the mouth of the bottle upwardly into the opening in the collar 26 and against the rubber washer or gasket 33. At this time the rods 29 will be raised by their cams 31, thereby raising the collar 26 and compressing the washer 33 between it and the lower end of the head 24. This compression of the washer forces it against the mouth of the bottle and effects a tight closure to prevent the escape of the liquid while the bottle is being filled. The operative parts are so timed and positioned that immediately after the compression of the washer 33 around the mouth of the bottle, the high point of the cam 51 will by the continued rotation of the shaft 2 encounter and force downward the lever 50, thereby drawing downward upon the rod 48 which being connected with the rod of the pump piston will move the piston downwardly and discharge from the cylinder of the pump the syrup which has been drawn therein by the previous upward movement of said piston. The yoke 54 is carried downward with the downward movement of the pump piston and actuates the arms 42 to close the valve 38 in the syrup pipe. The downward movement of the pump piston forces the syrup through the pipe 35 and through the port 34

into the filling chamber 25 from whence it enters the bottle. At the limit of the downward movement of the piston, one of the arms 42 will engage the projecting end of the valve stem 40 of the valve in the water pipe 41 and open said valve to permit a flow of carbonated water through the pipe 35 and through the induct port 34 into the filling chamber 25 and thence into the bottle. As the bottle is being filled, the vent passage 77 affords an escape for the air in the bottle, and also for any excess of gas which may remain in the chamber 25 after the bottle is filled. After the filling of the bottle, the high point 6 of the cam 4 will encounter the roller 9 in the shaft 8 and raise said shaft so as to carry the mouth of the bottle into forcible contact with the crown 58 supported in the upper portion of the chamber 25, at the same time the cams 80 will raise the rod 78 and carry upward the cross head 71, thereby raising the head block 72 sufficiently to withdraw the depending central portion 75 thereof from within the tapered ring 78, permitting the crown to be carried upwardly into said ring by the upward movement of the bottle, whereby it is crimped in said ring over the mouth of the bottle to effect a sealing thereof as shown in Fig. 11. Immediately after the sealing operation, the high point 6 of the cam 4 passes the roller in the lower end of the shaft 8 permitting said shaft to drop to its lowest point and enabling the removal of the capped or crowned bottle. While the head block is in the raised position as when the bottle is being crowned, the depending annular flange 73 thereof is withdrawn from the horizontal way 62 through which the crowns are fed into the chamber 25 so that upon the return stroke of the rod 48 which is carried upwardly by the spring 52, the upper inclined face of the cam plate 65 on the upper end of said rod will engage the plate 67 and move the slide 63 horizontally to feed a succeeding crown into the chamber 25 ready for the next operation. Upon the descent of the annular flange 73 of the head block after the crown has been placed in position, it closes the horizontal way 62 and prevents the escape of the liquid through said way when the bottle is being filled, as clearly shown in Fig. 5, the compressible washer 76 at the bottom of the annular channel 74 in which said flange lies, serving to make a tight closure between said flange and head. It will be noted that the slide 63 which feeds the crowns is actuated only by the upward movement of the rod 48. During the downward movement of said rod the annular flange 73 on the head block closes the horizontal way 62 so that a crown cannot enter the chamber 25, consequently the engagement of the lower beveled face of the cam plate 65 with the sliding plate 67 will actuate said plate only, the springs 69 yield-

ing to permit of said movement without imparting any movement to the slide 63. The compressible joint in the shaft 8 is for the purpose of compensating for various lengths of bottles so that in case a bottle of greater length than those for which the machine has been adjusted should be placed in the machine, the spring 17 would yield and prevent the breaking of the bottle.

10 By reason of the flaring induct port 34 which opens into the filling chamber 25, the carbonated or aerated fluid which enters said chamber under pressure through said port, is prevented foaming because of the enlarged discharge opening of said port 15 which allows a slight expansion of the gas upon entering said chamber and which because of its oblique position, projects the fluid downward into the mouth of the bottle 20 instead of directing it forcibly against the opposite wall of the filling chamber, as commonly practiced.

To support the outer end of the slide 63 and the independently movable plate 67 25 mounted thereon, a bracket 94 is employed projecting from a fixed portion of the frame and having a slot 95 therein which receives said slide and plate, as shown in Fig. 2.

Having thus fully set forth my invention, 30 what I claim as new and desire to secure by Letters Patent, is:—

1. In a bottle filling and crowning machine, the combination of a head, means for presenting a bottle to said head, a movable 35 collar around the lower portion of the head, a compressible ring confined between the head and collar, vertically reciprocatory rods connected with said collar, cams engaging the lower ends of said rods for moving the collar to compress the ring and force it 40 against the mouth of the bottle, and means for filling and crowning the bottle.

2. In a bottle filling and crowning machine, the combination of a head having a 45 filling chamber therein, a movable collar surrounding the opening in the head leading to said chamber, said collar having laterally extending arms, vertically movable rods attached to said arms, a compressible 50 ring between said collar and head around said opening, means for presenting a bottle to the head to cause the mouth of the bottle to lie within said ring, means for actuating said rods to move the collar and compress 55 the ring around the mouth of the bottle, means for filling the bottle, and means for crowning it.

3. In a bottle filling and crowning machine, the combination of a head having a 60 filling chamber therein, a movable collar on said head, a compressible ring within said collar around the opening leading to said chamber, means for presenting the mouth of a bottle within said ring, rods connected 65 to said collar for actuating it to compress

said ring around the mouth of the bottle, means for operating said rods, said head 70 having in the wall thereof an induct port leading into said chamber whose inner end is flaring and through which the fluid contents enters the bottle, means for directing fluid through said port into said chamber, means for presenting a crown within said 75 chamber above said port, and means for crimping said crown over the mouth of the bottle after the operation of filling.

4. In a bottle filling and crowning machine, the combination of a filler head, means for presenting a bottle to said head for filling, said head having a way therein communicating with the interior of the head for 80 the passage of the crowns, means for feeding the crowns successively through said way, a vertically movable head block for closing the upper opening in said head, said head block having a depending flange adapted to close the way leading to the interior 85 of the head through which the crowns are fed during the operation of filling, means for presenting the mouth of the bottle to the crown in the head, and means for crimping the crown onto the mouth of the bottle. 90

5. In a bottle filling machine, the combination of a head, means for presenting a bottle to said head for filling, a pump for conveying syrup to said head, a reciprocatory rod for actuating said pump, and means for locking said rod against movement when a bottle is not in position upon 100 the machine to be filled.

6. In a bottle filling and crowning machine, the combination of a head, means for presenting a bottle to the head for filling and crowning, a slide for feeding the crowns 105 into said head, a reciprocatory rod for actuating said slide, and a pump for feeding the syrup, said pump being actuated by said slide actuating rod.

7. In a bottle filling and crowning machine, the combination of a head, means for 110 presenting a bottle to said head for filling and crowning, a slide for feeding the crowns into said head, a pump for feeding the syrup, a reciprocatory rod for actuating said pump and slide, and means for locking that 115 portion of said rod which actuates said pump and slide against movement when a bottle is not in position to be filled and crowned.

8. In a bottle filling and crowning machine, the combination of a head, means for 120 presenting a bottle to said head for filling and crowning, a slide for feeding the crowns into said head, a pump for feeding the syrup, a reciprocatory rod for actuating 125 said pump and slide, and means for locking that portion of said rod which actuates said pump and slide against movement when a bottle is not in position to be filled and crowned, said rod having an expansion joint 130

therein which permits of a movement of the lower end thereof when the upper end is held against movement.

9. In a bottle filling and crowning machine, the combination of a head, means for presenting a bottle to the head for filling and crowning, a pump for feeding the syrup, a slide for feeding the crowns, a vertically reciprocatory rod for actuating said pump and moving said slide, said rod having an expansion joint therein, means for locking against movement that portion of said rod above said joint, said locking means being actuated to release the rod by a bottle in position upon the machine.

10. In a bottle filling and crowning machine, the combination of a head, a vertically reciprocatory shaft for presenting a bottle to the head for filling and crowning, said shaft having a contractible joint therein to compensate for bottles of varying heights, means for feeding syrup to the bottle, means for feeding the crowns, and means for locking the crown and syrup feeding devices against movement when a bottle is not in position to be filled.

11. In a bottle filling and crowning machine, the combination of a head, means for presenting a bottle to said head for filling and crowning, means for feeding the crowns, a pump feeding syrup, a vertically reciprocatory rod for actuating said pump and said crown feeding means, and means for regulating the stroke of the pump piston independently of the movement of said rod.

12. In a bottle filling and crowning machine, the combination of a head, means for presenting a bottle to said head for filling and crowning, said bottle presenting means being adjustable vertically for various heights of bottles, a syrup feeding pump and a crown feeding slide, a vertically reciprocatory rod for actuating said pump and slide, and means for locking said rod against movement when a bottle is not in position to be filled.

In testimony whereof, I sign this specification in the presence of two witnesses.

HENRY A. ALLWARDT.

Witnesses:

O. B. BAENZIGER,
I. G. HOWLETT.