N. M. LA PORTE.

FILLING AND CAPPING MACHINE.

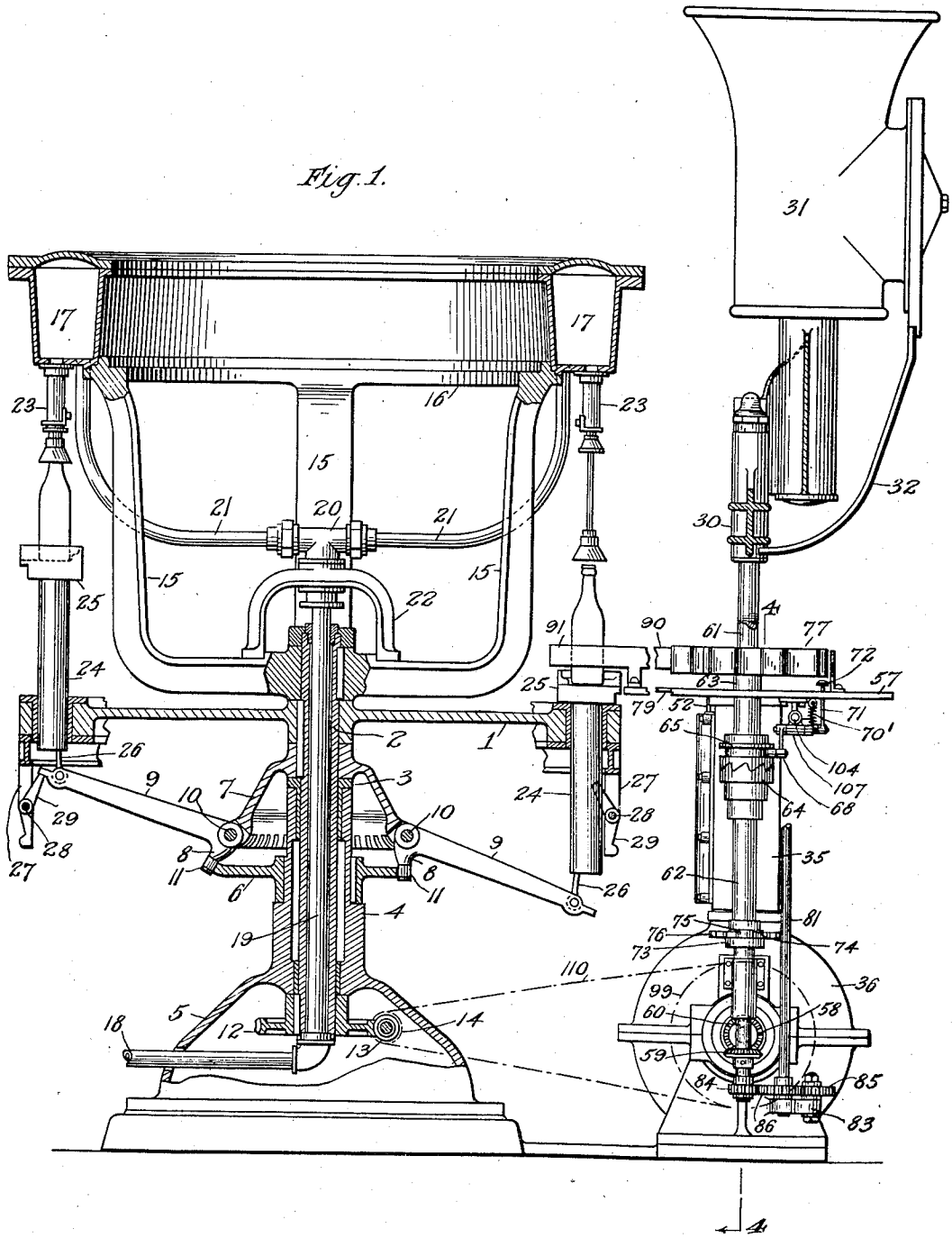
APPLICATION FILED JAN. 5, 1916.

1,332,264.

Patented Mar. 2, 1920.

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

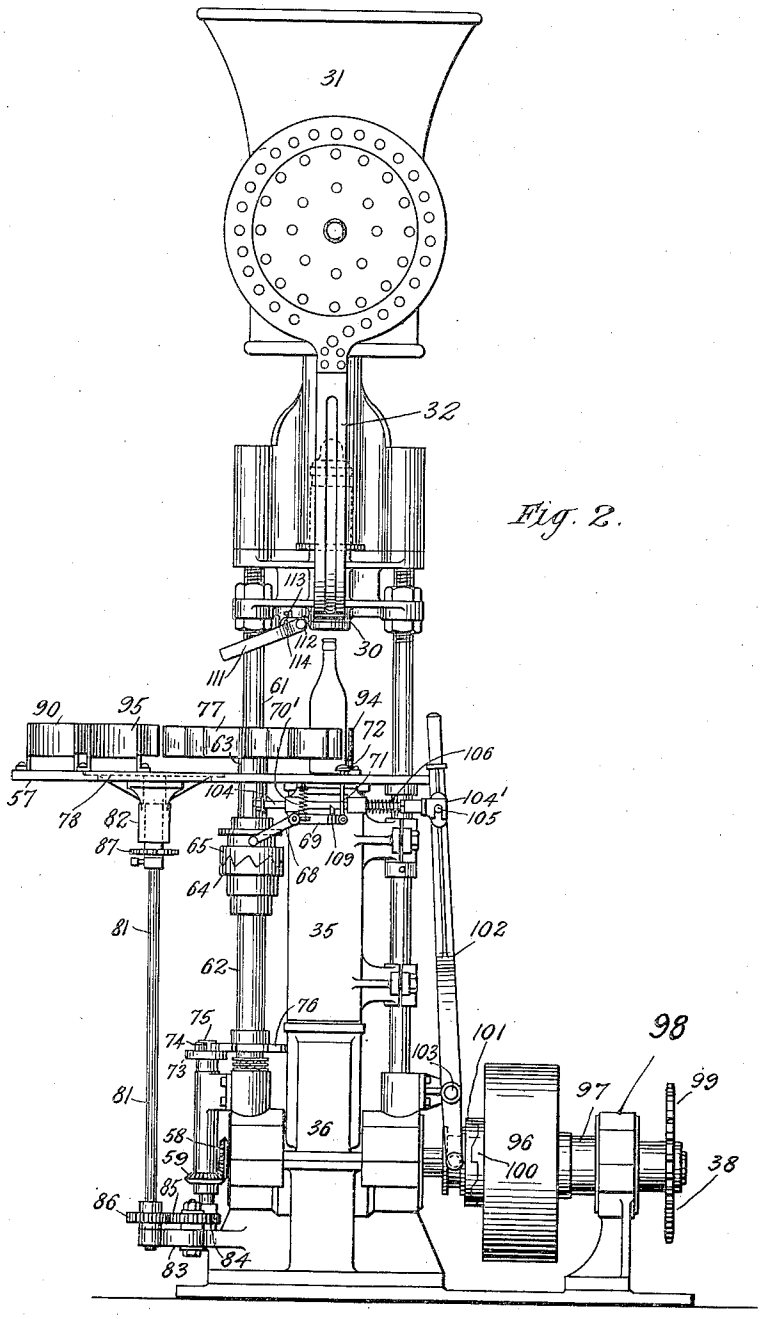


Fig. 2.

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5 SHEETS—SHEET 3.

Fig. 3.

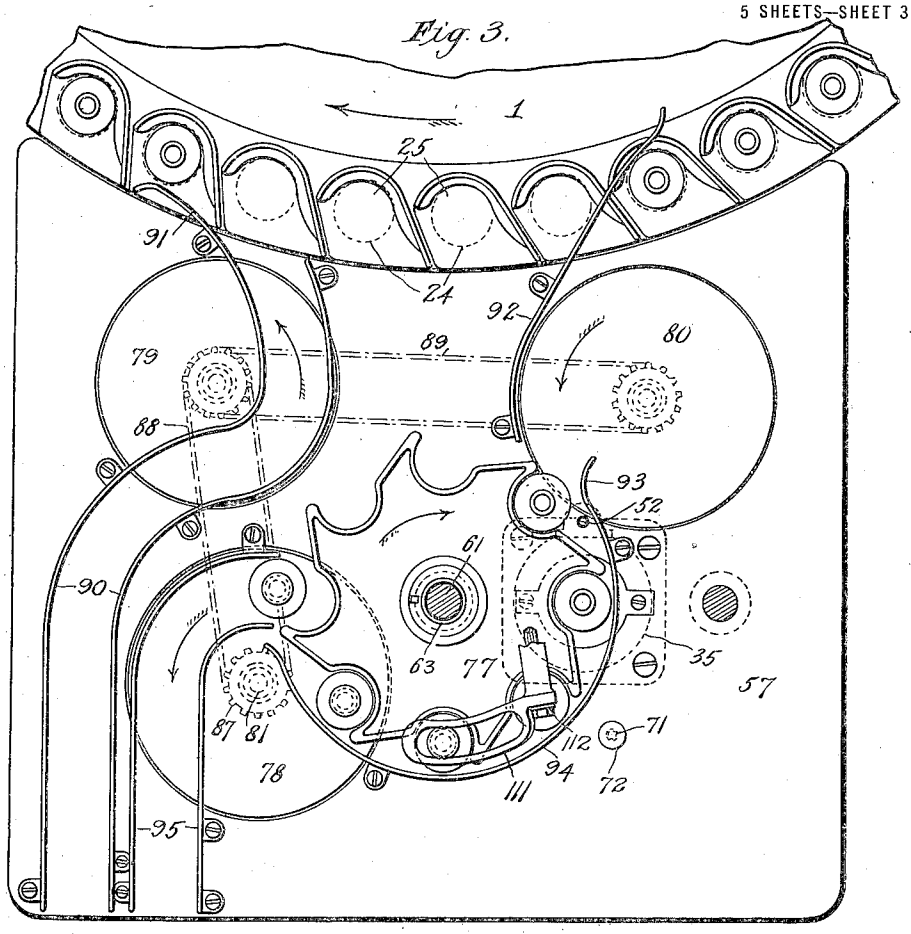
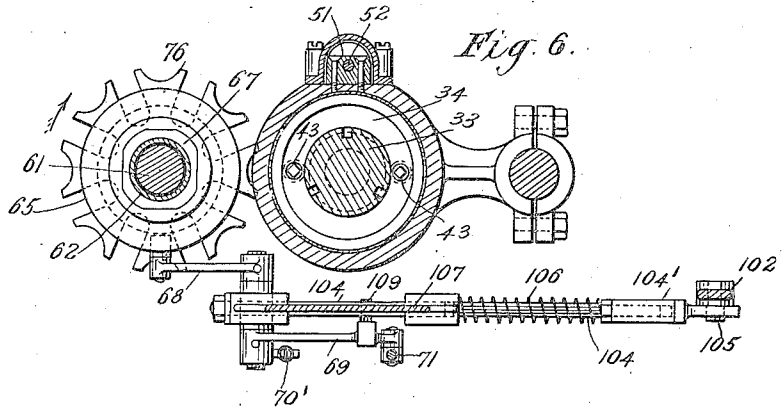


Fig. 6.



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5 SHEETS—SHEET 4.

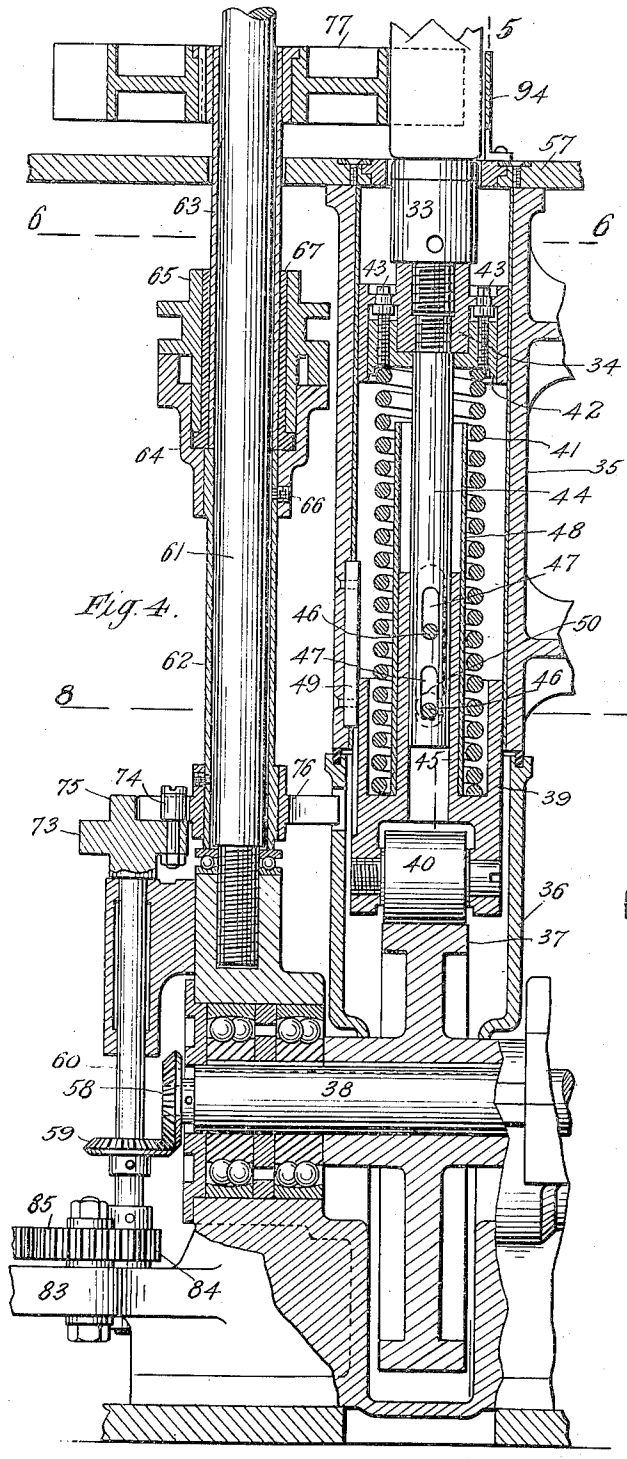


Fig. 4.

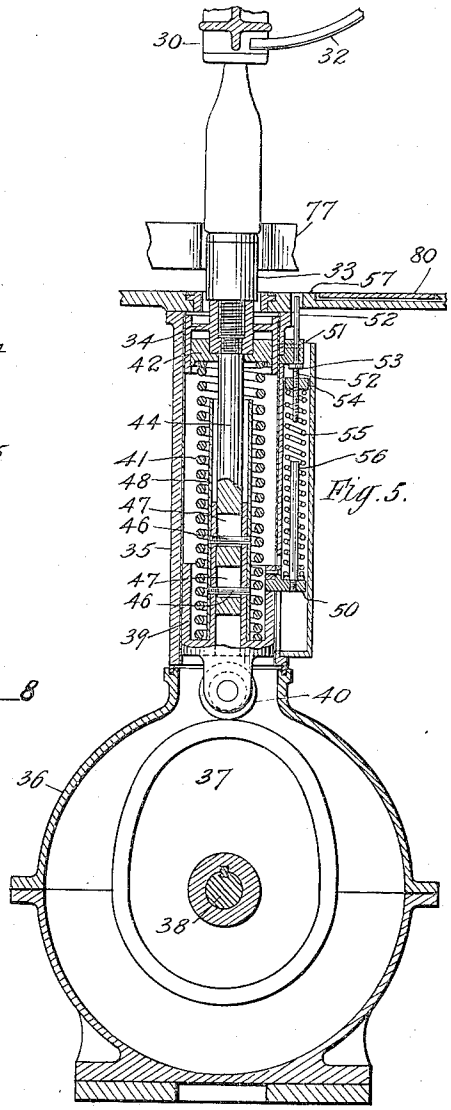


Fig. 5.

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5 SHEETS—SHEET 5.

Fig. 7.

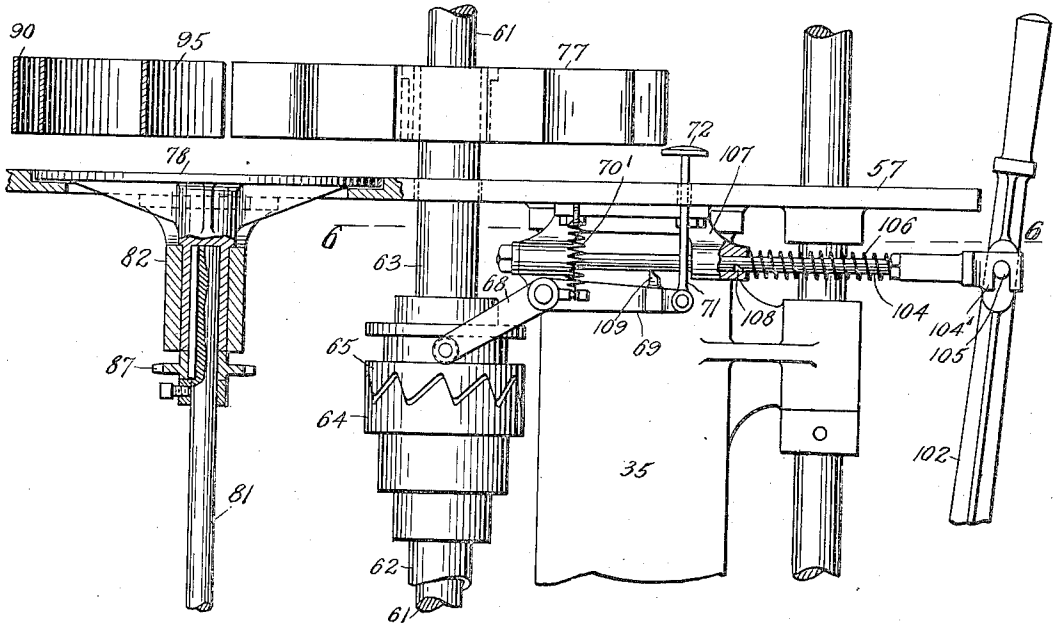


Fig. 8.

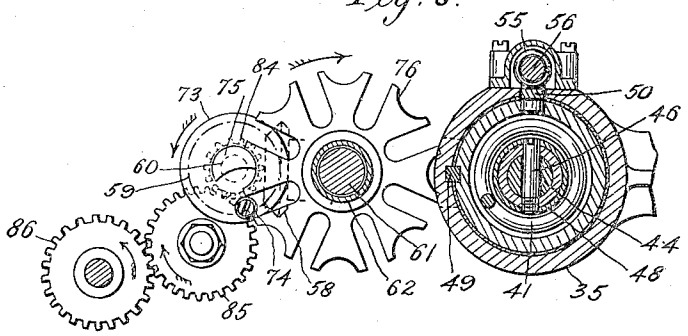
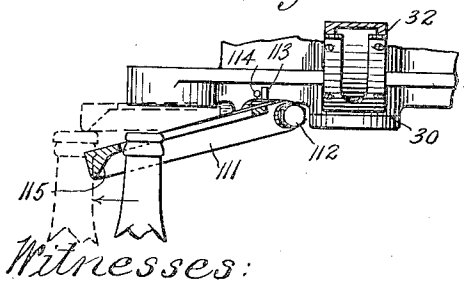


Fig. 9.



Witnesses:

Fig. 10.

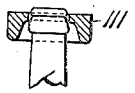
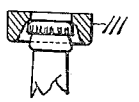


Fig. 11.



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UNITED STATES PATENT OFFICE.

NORBERT M. LA PORTE, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY OF BALTIMORE CITY, A CORPORATION OF MARYLAND.

FILLING AND CAPPING MACHINE.

1,332,264. Specification of Letters Patent. Patented Mar. 2, 1920.

Application filed January 5, 1916. Serial No. 70,489.

To all whom it may concern:

Be it known that I, NORBERT M. LA PORTE, a citizen of the United States, residing at Baltimore, State of Maryland, have invented certain new and useful Improvements in Filling and Capping Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in filling and capping apparatus, and the object of the invention is to provide means by which a rotary filling apparatus may be combined with a single plunger capping apparatus, and the bottles transferred from the filling apparatus to said capping apparatus in proper order, the mechanism being so arranged that if a bottle is not properly passed through the capping apparatus, the whole mechanism will be instantly stopped.

Combined filling and capping machines have been provided heretofore, but in such cases it has been customary either to embody in the filling machine the necessary capping means or to provide a separate capping apparatus with a plurality of capping heads in order to permit the capping apparatus to operate relatively slowly, so that in case of any failure of the capping operation or clogging of the machine by a bottle, the operator will have time in which to stop the machine or otherwise move the bottle. These prior constructions necessarily involve complicated and expensive machines, and also require close attention on the part of the operator. The purpose of the present invention is to provide an apparatus so constructed that a single capping head may be operated with sufficient rapidity to cap all the bottles coming from a rotary filling machine of normal size, this being rendered possible by the provision of automatic mechanism for transferring the bottles from the filling machine to the capping machine and conveying them through the capping machine at a high rate of speed, the mechanism including devices for immediately stopping the apparatus in case of any clogging of the machinery by a bottle or failure of the apparatus to properly cap a bottle.

The invention consists in the features, details of construction and combination of parts, which will first be explained in connection with the preferred embodiments of the invention shown in the accompanying drawings, and then more particularly pointed out.

In the drawings—

Figure 1 illustrates, partly in section and partly in elevation, an apparatus embodying the invention;

Fig. 2 a front elevation of the capping machine;

Fig. 3 a detail plan view illustrating the transferring apparatus;

Fig. 4 a detail sectional view of a part of the capping apparatus;

Fig. 5 a detail sectional view of the same on a small scale, and in a plane at right angles to Fig. 4;

Fig. 6 a detail sectional view on the line 6—6, Fig. 4;

Fig. 7 a detail view in elevation, partly in section; and

Fig. 8 is a view on the line 8—8, Fig. 4, looking downward:

Figs. 9, 10 and 11 are detail views illustrating the means by which an uncapped bottle is detected.

Referring to Fig. 1 of the drawings, a rotary multiple head filling machine is indicated, partly in section, at the left and a single head capping machine at the right.

The filling machine is of any usual kind, that illustrated being a well-known machine in general use, which may be briefly described as follows:

At 1 is indicated a rotary table splined to a hollow shaft 2, rotatable in bearings 3, carried by a hollow standard 4 arising from a base 5. To the standard 4 is secured a cam plate 6 and to the shaft 2 is fastened a lever-carrying device 7, in this case formed as a bell, whose margin is provided with a plurality of notches, in each of which may be fulcrumed a vertically swinging bell crank lever, two of these levers being shown in Fig. 1, the shorter arm of each lever being indicated at 8 and the longer arm at 9, while their fulcrums are indicated at 10.

The short arm 8 of each lever is provided with an antifriction roller 11 arranged to run in contact with the cam face of the cam plate 6.

To the lower end of the hollow shaft 2 is secured a driving device, in this case consisting of a worm-wheel 12, which is engaged by a worm 13 having a shaft extending transversely through the side of the base 5 and having its projecting end provided with suitable means by which the worm may be rotated, this consisting in the present example of a sprocket wheel, indicated in dotted lines at 14, in Fig. 1.

To the upper end of the hollow shaft 2 is secured a hub provided with a plurality of outward and upward extending arms 15, whose upper ends are connected by a ring 16, on which is mounted an annular closed tank 17 arranged to contain the beer, milk or other liquid with which the bottles are to be filled. This liquid is conducted to the tank from any suitable source of supply by a pipe system comprising the pipes 18, 19, the T-head 20 and the branch pipes 21. The T-head 20 is connected to the upper end of the vertical pipe 19 by a union so that the head 20 may rotate with the branch pipes 21 and the annular tank 17, while the vertical pipe 19 is stationary.

A suitable support for the upper end of the vertical pipe 19 and the lower extension of the T-head is provided, this consisting in the present example of a yoke 22 secured to the arms 15.

The annular tank 17 has a plurality of downward extending filling nozzles, two of which are indicated at 23, these nozzles being provided with any suitable controlling valves such as are employed with machines of this type.

The rotary table carries a plurality of bottle supporting devices, equal in number to the number of filling nozzles 23 carried by the tank, the respective bottle supporting devices being in alinement with their corresponding filling nozzles.

Each bottle supporting device comprises a vertically reciprocating hollow plunger 24 carrying at its upper end a bottle support 25. Each plunger is connected by a pitman, indicated at 26, to the outer end of the long arm 9 of its respective bell crank lever.

The under side of the rotary table 1 is provided with a plurality of downward extending lugs 27, to each of which is pivoted, as at 28, a two-armed latch device, indicated at 29, one arm of which is arranged to engage the outer end of its respective lever 9 to lock the said lever in its raised position during one portion of the operation of the machine and to be released therefrom by suitable stationary trip mechanism, not shown, at another portion of the operation of the machine.

The capping machine, which is shown at the right in Fig. 1, comprises a bottle support, a capping head, mechanism for supplying crowns to the capping head, and means for producing a relative movement of the capping head and bottle support.

The capping head indicated at 30 and the means for supplying crowns thereto may be of any desired construction. In the machine illustrated as an example, the capping head is indicated at 30, while the means for supplying the crowns is shown as comprising the usual hopper and selector 31, connected by a chute 32 to the capping head. This mechanism will not require specific description, as it is of the usual type found in machines now well known in the art.

Although any general type of bottle support and mechanism for producing a relative motion of the bottle support and capping head may be employed, an important feature of the present invention comprises a new and improved mechanism for producing such relative motion, as will now be explained:

Referring particularly to Figs. 4 and 5, 33 is a bottle support, carried by a piston head 34, movable in a cylinder 35, which, in turn, is mounted on a casing 36, in which is located a cam 37 fixed on a driving shaft 38. The cylinder 35 contains a lower piston 39 provided with downward projecting lugs carrying an anti-friction roller 40 arranged to bear on the periphery of the cam 37. Between the piston 34 and the piston 39 in the cylinder 35 is mounted a main spring 41. For the purpose of permitting the adjustment of this spring 41, its upper end is arranged to bear in a recess formed in the lower surface of an adjusting block 42, movably mounted within the piston head 34 and adjustable with relation thereto by means of screws 43, Fig. 4, threaded into the adjusting block and having collars bearing against the under surface of the web of the piston head 34, the upper ends of these screws projecting above said piston head 34 and being square to receive a suitable wrench. To the piston head 34 is attached a downwardly extending rod 44 suitably slotted as shown and fitting loosely within a tubular guide 45 projecting upward from the lower piston 39. This guide is provided with two pins 46 extending through the slots 47 in the said rod 44. The tubular guide 45 is surrounded by a tubular casing 48, which projects a considerable distance upward and is surrounded by the main spring 41. In order to prevent rotation of the lower piston rod 39 within the cylinder, suitable guiding means may be provided, as, for example, a feather 49 secured to the inside of the cylinder 35 and arranged to engage a slot in the lower piston 39. One side of the cylinder 35 is provided with a vertical slot, through which extends a bracket 50 secured to the lower piston 39. An abutment 51 is attached to the outer wall of the cylinder in

line with the bracket 50, and through this abutment extends the end of a screw 52 having a collar 53 engaging the under surface of the abutment 51, this screw being threaded through an adjustable block 54, between which and the bracket 50 is mounted an auxiliary spring 55. For the purpose of preventing displacement of this spring, a rod 56 is attached to the bracket 50 and extends upward within the spring 55 for a suitable distance. The upper end of the screw 52 extends through a hole in the table 57 which may be provided with a slot, so that by the use of a screw-driver the screw 52 may be turned when desired to adjust the tension of the auxiliary spring 55.

It may be noted that when a bottle is in place on the bottle support 33, the rotation of the cam 37 will lift the lower piston head 39 and through its action on the spring 41 will move the upper piston head 34 and, with it the bottle support 33 toward the capping head 30, whereby the cap will be applied to the bottle, the auxiliary spring 55 being compressed, after which, further rotation of the cam will permit the lower piston head 39 to descend under the action of the auxiliary spring 55. If, during the ascent of the bottle support, the bottle should encounter a resistance greater than provided for by the spring 41, the said spring will be compressed, so that no pressure can be brought on the bottle greater than that predetermined by the spring 41. Furthermore, this pressure is adjustable by the adjustment of the screws 43 in the adjustable block 42. This mechanism provides for an adjustment of the maximum pressure to which the bottle will be subjected during the capping operation and also provides means for quickly returning the bottle support to a position flush with the table, 57, by means of the spring 55, which acts to force the lower piston head 39 downward. Furthermore, this auxiliary spring 55 may be tensioned as desired, the pressure exerted by it being adjustable independent of the main spring 41.

In the machine illustrated in the drawings, the shaft 38 is shown as mounted in suitable ball bearings and is provided at one end with a bevel-wheel 58 arranged to engage a corresponding bevel-wheel 59 on a vertical shaft 60, suitably journaled in the frame. A standard 61, secured at its lower end in the framework of the machine and acting as one of the supports for the capping head and crown-supplying mechanism, serves as an axis for a tubular shaft, comprising two parts, 62, 63, arranged end to end and adapted to be clutched together by a suitable slip connection, such, for example, as a clutch device consisting of a part 64 in fixed relation to its shaft and a movable part 65. These two parts or members have serrated engaging surfaces which incline, as shown in Fig. 7. In the present example, the relatively fixed member 64 is secured to the lower tubular shaft 62 in any suitable way, as, for example, by means of a screw 66, Fig 4. The movable clutch member 65 is connected to the upper tubular shaft 63 in such a manner as to permit the movement of the movable clutch member in the direction of the axis of the shaft, while at the same time compelling the rotation of the shaft 63 with said movable clutch member. This may be accomplished in any usual manner, as, for example, by making the opening in the movable clutch member polygonal in cross-section, and provides a sleeve 67, of corresponding exterior cross-section, which is rigidly secured to the lower end of the tubular shaft 63 (see Fig. 6). The movable clutch member 65 is provided with a peripheral groove engaged by the formed end of a clutch-operating lever having two arms 68, 69, this lever being fulcrumed at any suitable point on the machine frame, and arranged to be acted upon by a spring 70′, tending to maintain the two members of the clutch in engagement with each other, yet capable of yielding to allow the movable member of the clutch to separate from the other member of the clutch. The arm 69 of the clutch-operating lever is pivotally connected with a push rod 71, having a head 72 above the top of the table 57.

The lower tubular shaft 62 receives an intermittent motion from the shaft 60 through any suitable mechanism. Most advantageously the transmission of power from the shaft 60 to the shaft 62 is done by means of a suitable Geneva stop mechanism which in the present example comprises a driving member 73, having the usual driving pin 74 and the crescent-shaped locking head 75 arranged to coact with the Geneva star-wheel 76 fixed on the shaft 62. By this mechanism, illustrated in detail in Fig. 8, the shaft 62 will be intermittently moved a predetermined angular distance at each rotation of the shaft 60 and when not moving will be locked by the part 75.

To the upper end of the tubular shaft 63 above the table 57 is secured a bottle-transporting wheel or star-wheel 77, which is provided with a serrated edge comprising portions concaved to receive a bottle and to bear against the same in a substantially radial manner, with intermittent inclined portions which are preferably straight, as will be understood from the plan view of the wheel 77, in Fig. 3. The table 57 is provided with three circular recesses, in each of which is mounted a rotary disk or table, these tables being indicated at 78, 79 and 80, respectively. The upper surface of each table is flush with the stationary table 57. The table 78 is mounted on the upper end of a

shaft 81, suitably journaled near its upper end in a bracket 82 secured to the under side of the table 57 and at its lower end in an arm 83 extending outward from the base of the machine. Motion is transmitted to the shaft 81 from the shaft 60 by suitable gearing, as indicated at 84, 85, 86, Fig. 2. The other rotary tables 79, 80, are driven from the shaft 81 in any suitable way, as, for example, by providing the shaft 81 with a sprocket-wheel 87, around which passes a chain 88, which passes over a sprocket-wheel on the axis of the table 79, this axis being provided with another sprocket-wheel which is connected with a sprocket-wheel on the axis of the table 80 by means of a chain 89. These driving connections will be clear from the dotted lines in Fig. 3. A bottle entrance guide-way, for the purpose of supplying bottles to the filling machine, is provided by means of two curved rails 90, Fig. 3, which pass from near the front of the table 57 back toward the rotary table 1 of the filling machine, these guide-ways passing over the rotary table 79 in a substantially circumferential curve. The guides 90 are held sufficiently above the bottle supports on the filling machine table to enable said bottle supports to pass beneath one end of one of the guide-rails 90, which is extended some distance over the filling machine table, this extension being indicated at 91, Fig. 3.

It will be obvious that as bottles are pushed down the bottle guide-way between the two rails 90, they will finally be forced onto the rotating table 79, whose location and direction of rotation is such that the bottles will be carried around toward the filling machine and then discharged, one at a time, into the bottle supports, as the latter come opposite the discharge end of the bottle guide-way. The filled bottles are forced out of the bottle supports by means of a deflector arm indicated at 92, Fig. 3, which extends above the bottle supports into the path of the bottles, and by this means the filled bottles will be discharged from the filling machine onto the rotating table 80, where they are carried around until they contact with the end 93, of a curved guide-rail 94, arranged substantially concentric with the wheel 77, the end 93 serving to deflect the filled bottles, one at a time, into the semi-circular recesses in the wheel 77, while the remaining portion of the curved guide-rail 94 serves to hold the bottles in these concave portions or pockets, so that the bottles will be transported onto the bottle support of the capping machine and, when capped, will then be carried away and discharged onto the rotating table 78. This table rotates beneath guide-rails 95 which form a discharge passageway, through which the filled and capped bottles are forced from the machine.

It is to be noted that by the driving mechanism hereinbefore described, the wheel 77 is given a step-by-step movement, whereas the tables 78, 79, 80, are rotated continuously.

The shaft 38 is arranged to be driven by any suitable means and between this shaft and this driving means is a clutch mechanism, so that the rotation of the shaft 38 may be stopped when desired. In the present example, the shaft 38 is arranged to be driven by a pulley 96 mounted on a tubular shaft 97 surrounding the shaft 38, this tubular shaft being supported in a bearing 98 and having a reduced end extending beyond the bearing and provided with a sprocket-wheel 99. The tubular shaft 97 is provided inside the pulley 96 with a relatively fixed clutch member 100 arranged to be engaged by a coöperating clutch member 101 splined to the shaft 38 and capable of axial movement with relation thereto. The movable clutch member has the usual peripheral groove engaged by the forked end of a clutch-operating lever 102 fulcrumed at 103 on a suitable part of the machine frame, this lever 102 being provided with a handle at its upper end, whereby the clutch lever may be drawn manually, when desired. The lever 102 is engaged by means tending to force the lever in a direction to unlock the clutch, this means consisting in the present example of a rod 104, having a notched head 104′, the notch of which is arranged to engage a pin 105 secured to the lever 102. The rod 104 is surrounded by a spring 106, one end of which bears against a head 104′, and the other end bears against a bracket 107, through which the rod 104 is guided. The bracket is secured to the under side of the table 57 and has two bearing portions encircling the rod 104. The rod is provided with a notch, indicated at 108, Fig. 7, arranged to be engaged by a tooth 109 projecting upward from the arm 69 of the bell crank lever hereinbefore described. When the lever 102 is forced in a direction to close the clutch members 100, 101, the notch 108 will be engaged by the tooth 109 and thereby the lever 102 will be locked in a position to close the main clutch. If the head 72 of the rod 71 be pressed, the lever 69 will be forced downward and the tooth 109 released from the notch 108 in the rod 104, whereupon the shaft 38 will be stopped, notwithstanding the continued rotation of the pulley 96, and the capping mechanism and bottle transporting mechanism also will be stopped. Furthermore, if the bottle-transporting-wheel 77 should encounter friction greater than that which is normal, the clutch members 64, 65, owing to the incline of their engaging faces, will be forced apart against the action of the spring 70′, so that the said transporting-wheel 77

would thereby be stopped by the opening of said clutch members 64, 65. As the movable clutch member 65 rises, it will also swing the bell crank, consisting of two arms 68, 69, and thereby release the tooth 109 from the notch 108 in the rod 104, whereupon the spring 106 will throw the clutch member 102 to unlock the clutch members 100, 101.

The filling machine is driven from the sprocket-wheel 99 by means of a chain 110 passing around the sprocket-wheel 14 which drives the worm 13 of the filling machine.

The capping apparatus is provided with mechanism for detecting an uncapped bottle, this detecting mechanism being arranged to stop the capping machine. In the present example, this detecting mechanism consists of a swinging slotted arm 111 fulcrumed on a suitable part of the framework, as at 112, and arranged to swing downward at a predetermined angle, this movement downward being limited by means of a pin 113 projecting upward from the axis of the arm 111 and arranged to engage a stop pin 114 suitably fixed in the framework. The slotted arm 111 is generally segmental in plan, as shown in Fig. 3, so that the bottles when carried around by the wheel 77 will travel beneath said arm 111. The slot in the arm is of such a width as to permit an uncapped bottle neck to pass therethrough, but it is not wide enough to permit the neck of the capped bottle to pass through it. The arm is further provided with an inclined surface 115, so that when a capped bottle passes beneath the arm 111, the bottle neck will come in contact with said inclined portion 115 and lift the arm 111 up, so that the bottle may pass freely from beneath said arm. This will be clear from the showing in Fig. 9.

If a bottle leaves the bottle support without having a cap thereon, the detector arm 111 will not be lifted, but will sink down and engage the bottle neck. This will tend to stop the rotation of the bottle-transporting wheel 77. Such resistance to the rotation of the wheel 77 causes the lower clutch member 64 to force the clutch member 65 away from itself, thus opening the clutch and shifting the bell crank 68, 69, to release the rod 104 and thereby stop the machine. This will call the attention of the operator to the uncapped bottle, whereupon this bottle may be transferred to the table 80 and the capping machine again set in operation by means of the hand lever 102. In this way the bottle transferred to the table 80 will later again pass to the capping machine and be capped.

It will be clear that any undue increase of resistance to the motion of the bottle-transporting device 77 will result in stopping the operation of the capping machine.

Hence, if a bottle sticks in the capping head, or falls down on the table 78 when being discharged from the wheel 77 and thereby blocks the discharge of succeeding bottles, the machine will be automatically stopped.

What is claimed is:

1. In a capping machine, the combination of a pair of sliding heads arranged in alinement, a spring intermediate said heads, a bottle support carried by the upper head, a cam arranged to lift the lower head and therewith the upper head by means of said spring, a bracket carried by said lower head, a stationary abutment, and an auxiliary spring intermediate said bracket and abutment.

2. In a capping machine, the combination, with two springs, a cam arranged to press said springs simultaneously in one direction, a bottle support carried by one spring, a stationary abutment against which the other spring bears, means for adjusting the abutment, and a capping head arranged to coact with the bottle support to apply a cap to a bottle thereon.

3. In a capping machine, the combination of a pair of sliding heads arranged in alinement, a spring intermediate said heads, a bottle support carried by the upper head, a cam arranged to lift the lower head and therewith the upper head by means of said spring, a bracket carried by said lower head, a stationary abutment, means for adjusting the abutment, and an auxiliary spring intermediate said bracket and abutment.

4. The combination, with a capping machine having a capping head, and means for conveying a receptacle to be capped to the capping head and away from the same, of a transfer mechanism arranged to transfer receptacles to said conveying means, means for driving the transfer mechanism and the capping machine, yielding mechanism for operating the conveying means, and mechanism operated by obstruction of the conveying means and arranged to stop the driving means.

5. The combination, with a capping machine having a capping head, conveying means arranged to convey a receptacle to be capped to the capping head and away therefrom, and operating mechanism for operating said conveying means, of a slip connection between said operating means and the conveying means, whereby only a predetermined operating force can be applied to said conveying means, a transfer mechanism arranged to transfer receptacles to said conveying means, and means operated by the slipping of said slip connection and arranged to stop the capping machine, the transfer mechanism and the operating means of the conveying mechanism.

6. The combination, with a capping machine having a capping head, means for con-

veying a receptacle to be capped to the capping head and away therefrom, of mechanism for driving the capping machine and the conveying means, and mechanism actuated by retardation of the conveying means relative to the capping means and arranged to stop said driving mechanism.

7. The combination, with a capping machine having a capping head, means for conveying a receptacle to be capped to the capping head and away therefrom, an intermittent feed device for actuating said conveying means, and means for driving said intermittent feed device and the capping machine, of mechanism actuated by retardation of the conveying means relative to the capping means and arranged to stop said driving means.

8. The combination, with a capping machine having a capping head, means for conveying a receptacle to be capped to the capping head and away therefrom, and an intermittent feed device for actuating said conveying means, of a slip connection between said feed device and the conveying means, means for driving the intermittent feed device and the capping machine, and mechanism operated by the slip device for stopping said driving means.

9. The combination, with a capping machine having a capping head, means for conveying a receptacle to be capped to the capping head and away therefrom, a shaft comprising two parts, one of which is directly connected to said conveying means, step-by-step operating means for operating the other part of said shaft, a clutch comprising two members having interlocking inclined surfaces, said members connecting the two parts of the shaft, a driving means for driving the step-by-step operating means and the capping machine, and mechanism operated by the axial movement of one clutch member and arranged to stop said driving means.

10. The combination, with a capping machine having a capping head, and means for conveying a receptacle to be capped to and from the capping head, of a detector device arranged in the path of the receptacles from the capping head, said detector device having an opening to receive the neck of an uncapped bottle, whereby the travel of said bottle is stopped, said opening being smaller than the diameter of a capped bottle cap.

11. The combination, with a capping machine having a capping head, and means for conveying a receptacle to be capped to and from the capping head, of a detector device arranged to engage the top of a receptacle after it has passed the capping head and having an opening to receive the neck of an uncapped bottle, said opening being smaller than the diameter of a capped bottle cap, means for driving the conveying means and the capping machine, and mechanism operated by retardation of the conveying means relative to the capping machine upon the catching of an uncapped bottle in the detector device and arranged to stop said driving means.

12. The combination with a capping machine having a capping head, of a serrated transporting wheel for conveying receptacles to be capped to and away from said capping head, means for rotating said wheel with a step by step movement, a rotary table for conveying receptacles to said wheel, means for giving said table a continuous rotary movement, a rotary table for conveying receptacles away from said wheel, and means for giving said rotary table a continuous rotary movement.

13. In a capping machine, the combination of a spring, a bottle support carried thereby, a sliding member having a portion bearing against said spring, a pin and slot connection between said bottle support and said sliding member, a bracket on said sliding member, a fixed abutment, an auxiliary spring between said bracket and said abutment, and a cam for moving said sliding member.

14. In a capping machine, the combination of a pair of sliding heads arranged in alinement, a spring intermediate said heads, a bottle support carried by the upper head, a downwardly extending rod on the upper head provided with a slot, a guide member on the lower head in which said rod reciprocates, a pin on said guide member riding in said slot, a fixed abutment, an auxiliary spring between said abutment and the lower head, and a cam for lifting the lower head and therewith the upper head by means of the spring.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

NORBERT M. LA PORTE.

Witnesses:
H. M. LAITHE,
E. LOVELL.