A. JOHNSON.

BOTTLE CAPPING MACHINE.

APPLICATION FILED MAY 6, 1911.

1,055,753.

Patented Mar. 11, 1913.

4 SHEETS—SHEET 1.

Fig. 1

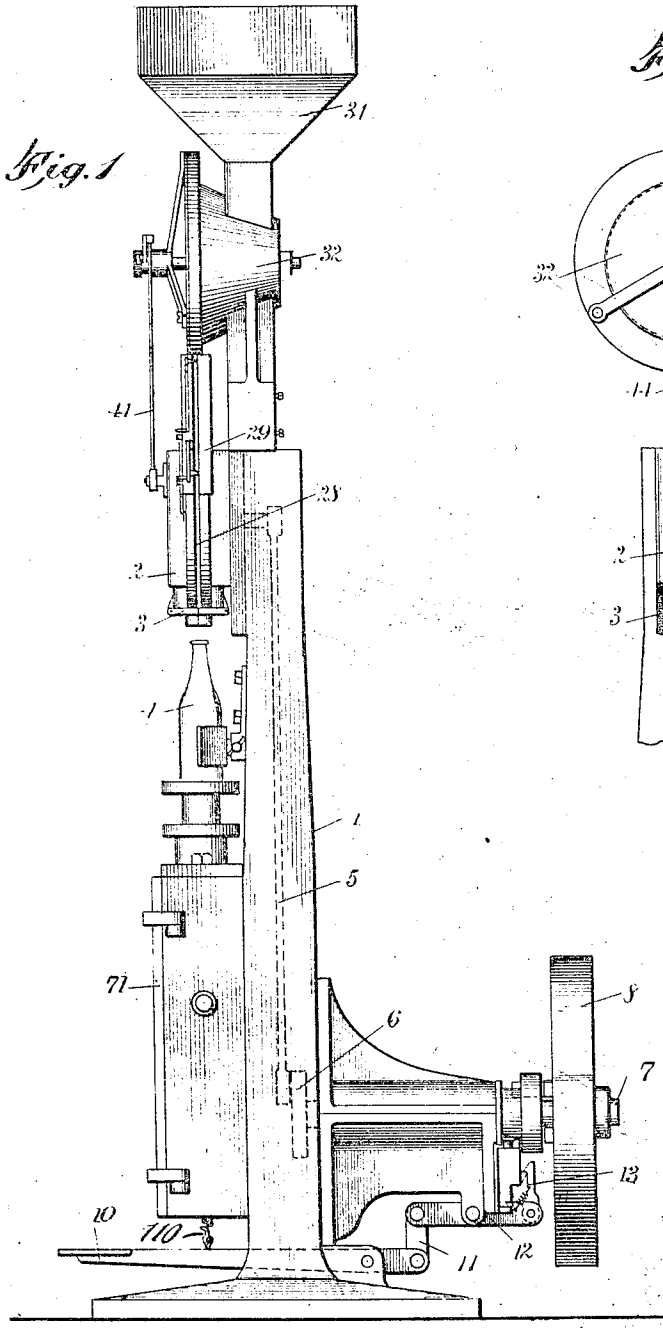
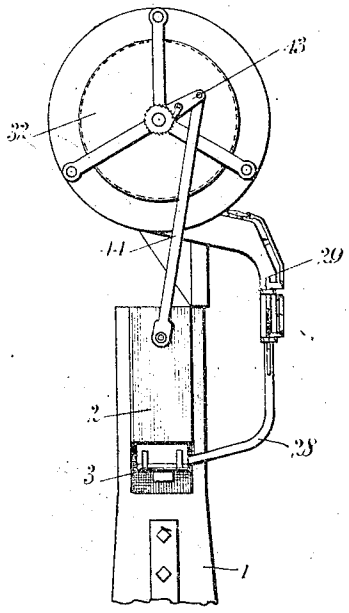


Fig. 2



WITNESSES

H. D. Smith

H. Whiting

INVENTOR

Aaron Johnson

BY Munn & Co

ATTORNEYS

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4 SHEETS—SHEET 2.

Fig. 3

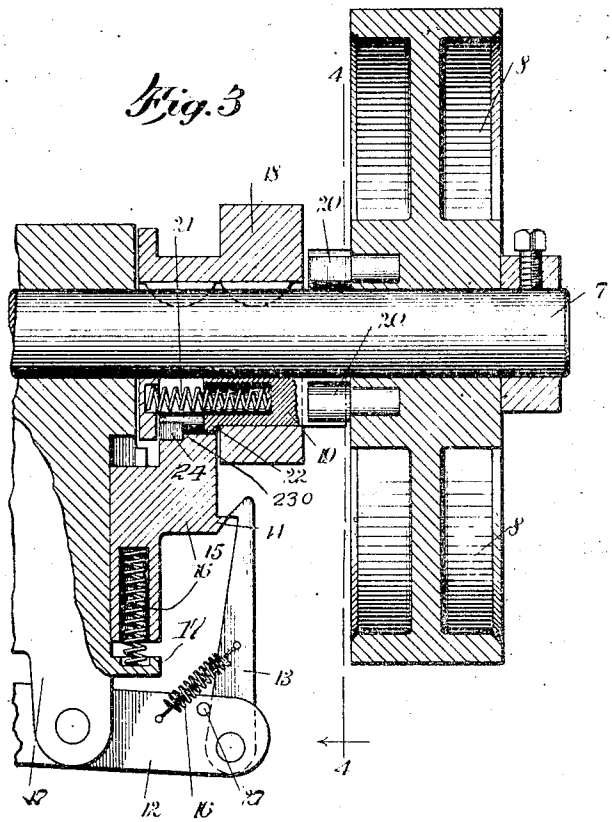


Fig. 4

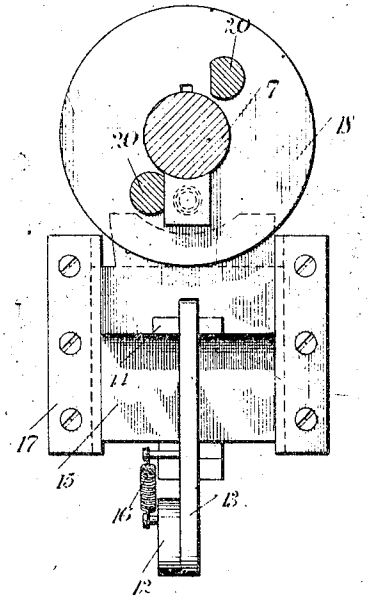


Fig. 5

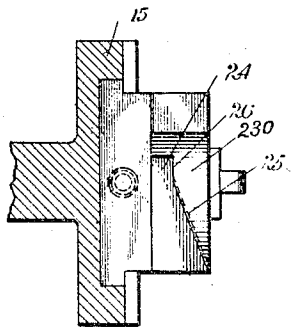


Fig. 6

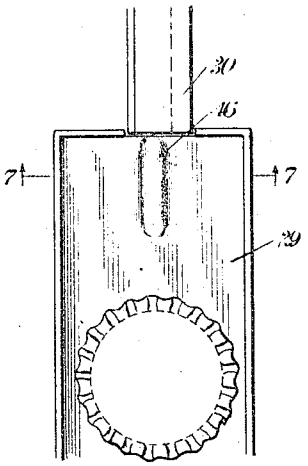
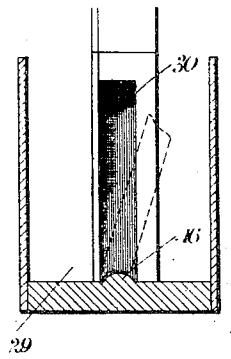


Fig. 7



WITNESSES

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4 SHEETS—SHEET 3.

Fig. 8

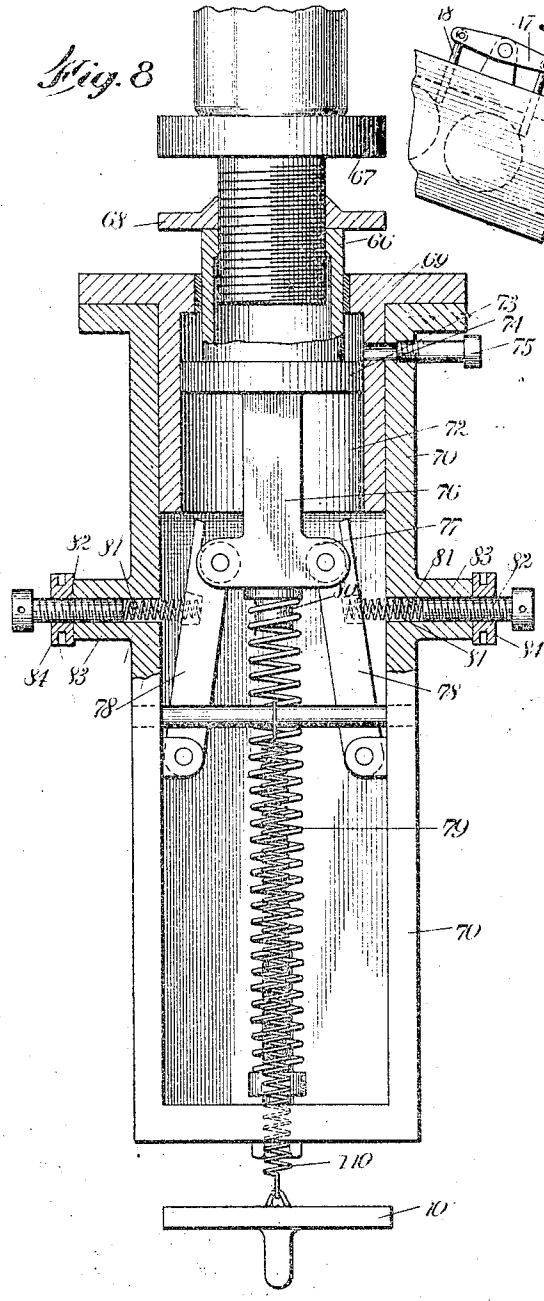


Fig. 9

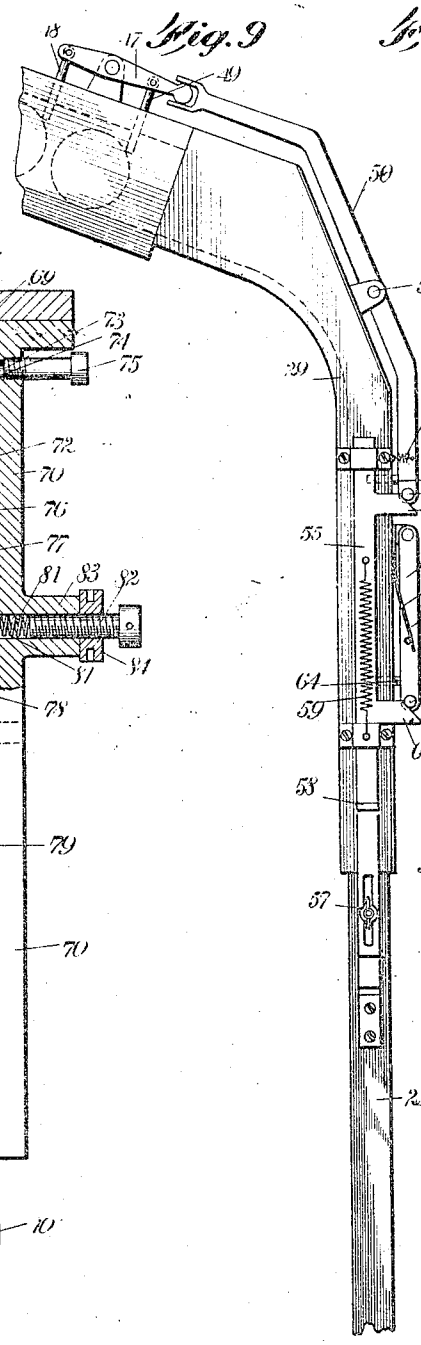
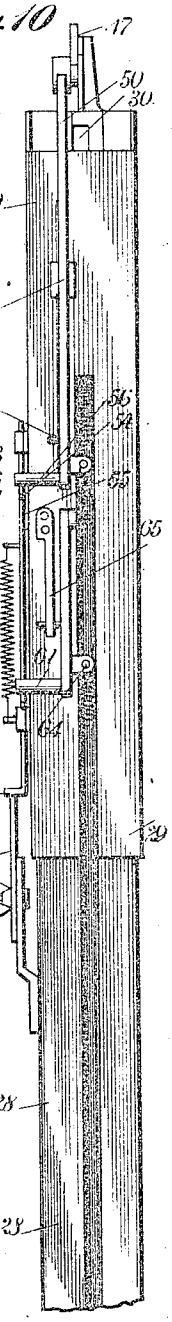


Fig. 10



WITNESSES

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4 SHEETS—SHEET 4.

Fig. 12.

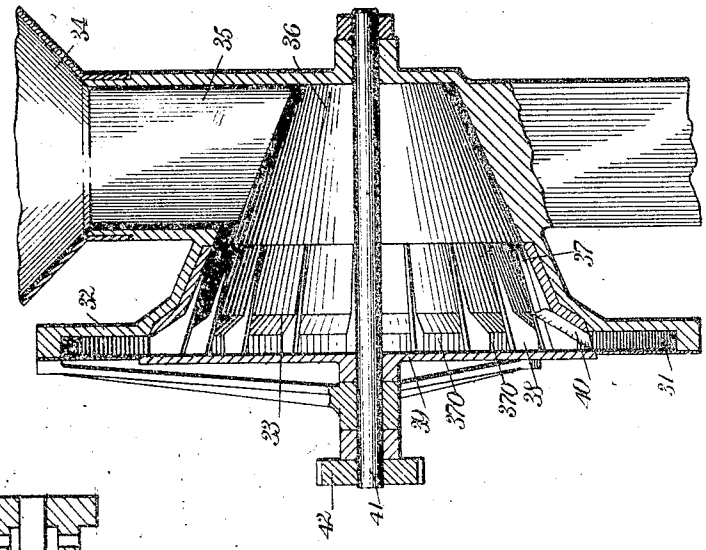

Fig. 13.

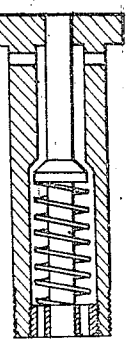

Fig. 11.

WITNESSES

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ATTORNEYS

UNITED STATES PATENT OFFICE.

ARON JOHNSON, OF NEW YORK, N. Y.

BOTTLE-CAPPING MACHINE.

1,055,753. Specification of Letters Patent. Patented Mar. 11, 1913.

Application filed May 6, 1911. Serial No. 625,468.

To all whom it may concern:

Be it known that I, ARON JOHNSON, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Bottle-Capping Machine, of which the following is a full, clear, and exact description.

This invention relates to a new and improved machine for affixing caps to bottles or the like.

An object of this invention is to provide a new and improved feature for a hopper, whereby the caps to be affixed to the bottles will be fed in their proper position and in the right quantity, so that there will be no clogging, and so that there will be a cap in position at each capping operation.

Another object of this invention is to provide a compensating mechanism for allowing for different-sized bottles, which will remain stationary for bottles of a common length, and yet which will yield under an abnormal pressure due to bottles of abnormal length, and which will also be adjustable to different sizes of bottles and have a shock-absorbing means tending to retard the return action of the compensating mechanism.

A further object of this invention is to provide an automatic means for connecting the actuating mechanism for the capping mechanism, which will be single-acting, that is to say, give a single cycle of movements to the cap-affixing mechanism for one depression of the pedal, irrespective of the length of time which this pedal is held in its depressed position.

These and further objects, together with the construction and combination of parts, will be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a side view in elevation; Fig. 2 is a fragmentary front view in elevation; Fig. 3 is an enlarged vertical section of the connecting or clutching mechanism for giving a single cycle of movements to the mechanism; Fig. 4 is a vertical section on the line 4—4 of Fig. 3; Fig. 5 is a horizontal section of part of the mechanism shown in Figs. 3 and 4; Fig. 6 is a top plan view showing the change from the vertical chute to the transverse chute, and the means for positively turning the caps in the same direction, irrespective of their position in passing from the first chute; Fig. 7 is a vertical section on the line 7—7 of Fig. 6; Fig. 8 is a vertical section through the compensator; Fig. 9 is a fragmentary view in front elevation, showing the means for controlling the feeding of the caps in the chute; Fig. 10 is a side view in elevation of the mechanism shown in Fig. 9; Fig. 11 is an enlarged front view in elevation of the feeding and controlling mechanism for regulating the passage of caps from the hopper and along the chutes partly broken away to show the underlying structure; and Fig. 12 is a vertical section on the line 12—12 of Fig. 11; while Fig. 13 is a sectional view of the check valve shown in Fig. 6.

Referring more particularly to the separate parts of this invention, as embodied in the form shown in the drawings, 1 indicates a machine framework or standard, on which is slidingly mounted in any suitable manner the cap-affixing mechanism represented by the plunger 2, having a pair of opposed drop-hinge doors 3, adapted to support a cap above a bottle to which the cap is to be affixed, indicated at 4, and yet arranged so as to swing open when the cap has been affixed to the bottle, permitting the cap to be removed with the bottle, from the cap-affixing mechanism.

The plunger 2 is connected by a rod 5, indicated in dotted lines in Fig. 1, to a crank 6 on a shaft 7. The shaft 7 is adapted to be driven from any suitable source of power, as for example by a belt connected to a pulley 8 loosely mounted on the shaft 7. The connecting mechanism between the shaft 7 and the pulley 8 is preferably of such a character that it can be controlled by a treadle 10, so that a single depression of the treadle will cause a single rotation of the shaft 7 and thus a single cycle of movements of the cap-affixing mechanism and the mechanism connected thereto, no matter how long the treadle is depressed after the first actuation, the treadle being automatically returned when the pressure thereon is relieved, by a spring 110. To accomplish this purpose, the treadle 10 is connected at its opposite end, beyond its pivot point, in any suitable manner, as by

means of a link 11, to a lever 12 pivoted intermediate its ends. At the far end of the lever 12, there is provided a somewhat hook-shaped tripper 13, which is pivotally connected to the lever 12, and is adapted to engage a projecting dog 14 on a lock 15. The tripper 13 is normally held in such a position that it will automatically engage the dog 14 by means of a spring 16, the tripper and dog being so beveled that when the tripper moves upwardly, it will automatically cam over the dog and engage therewith.

The lock 15 is normally held in its uppermost position by means of the spring 16, which finds a suitable support and backing on a bracket 17, which also is used in this instance to form a pivotal support for the lever 12. As shown particularly in Fig. 3, the lock 15 is positioned in a slot in the bracket 17.

Secured to the shaft 7 in any suitable manner, so as to rotate the same; there is provided a collar 18, which is normally disconnected from the pulley 8, but adapted to be connected thereto by a sliding pawl 19, which is movably mounted in the collar 18, and is adapted to engage one or the other of a plurality of lugs 20 projecting from the side of the pulley 8. A spring 21 tends to force the pawl 19 out into the path of the lugs 20, but under normal conditions, when the treadle 10 has not been depressed, this pawl 19 is secured in its retired or non-projecting position by a lug 22 on the pawl engaging behind an enlargement or ridge 230, forming a groove 24 in the lock 15. The ridge 230 is beveled at 25 to form a cam, which will automatically withdraw the pawl 19 from its projecting engagement with the lugs 20 during the last portion of a revolution of the shaft 7 with the pulley 8, so that the lug 22 is held back to the straight portion indicated at 26, of the ridge 230 in the groove 24. Inasmuch as the lock 15 is depressed by the treadle 10, it is necessary to provide for the return of the lock to its upper and locking position, in case the treadle should be held down for a greater period than is necessary to rotate the shaft 7 once with the pulley 8. For this purpose, there is provided a throw-off pin 27, which, at the final portion of the depression of the treadle 10, engages the tripper 13 and forces the hook end thereof off from the dog 14.

The caps to be affixed to the bottles 4 are supplied by means of a supplementary chute 28, which moves with the cap-affixing plunger 2 and is slidingly mounted in a chute 29, from which it receives the caps. The chute 29 is of greatest dimension transversely, so that the caps will occupy a proper position in being delivered to the chute 28. The upper end of this chute 29 is of considerable magnitude to allow for the reversal of a cap, in a manner to be described, in coming to the chute 29 from the hopper chute 30.

The conveying hopper chute 30 forms a continuation of a circumferential passage 31 provided in a casing 32, which may be termed the feeder casing, in that it incloses a feeder 33. The caps coming to the feeder 33 are supplied from a hopper 34 disposed above the feeder and connected thereto by a passage 35. It is to be noted that the lower part of the passage 35, which may in fact be called a portion of the feeder casing 32, is in the shape of a frustum of a cone, indicated at 36, and is recessed in the form of a frustum of a cone at 37, to permit the feeder 33 to rotate in the casing 32 and have its inner surface form a substantial continuation of the frusto-conical surface of the casing 32. The purpose of this is to permit the caps to slide by gravity into the feeder 33, and from the feeder into the circumferential passage 31.

It will be noted that the feeder 33 is provided throughout its circumference in juxtaposition to the circumferential passage 31, with a plurality of outlets 370, whereby the caps in the feeder can pass into the passage 31. These outlets are of substantially the same size as the caps, and are formed by a series of radial partitions 38. It will be noted that the feeder is provided with a plurality of ribs 39, which project radially inwardly from the surface of the feeder, and are for the purpose of lifting the caps as the feeder rotates, so that they will not clog in case they become improperly positioned at the bottom of the feeder. A further provision to prevent the clogging of the caps is to be noted by reference to Fig. 12, where it will be seen that the feeder, instead of being in a single conical form, is double-conical, that is to say, its portion adjacent the outlets 370 is inclined at an angle to the remaining portion, so that the caps will naturally fall, as indicated by the cap 40 in Fig. 12, into the outlets, and thus into the passage 31, without danger of becoming stuck in a horizontal position.

The feeder 33 may be rotated in any suitable manner, as by being secured to a shaft 41, which is connected in driving relation in any suitable manner to the cap-affixing mechanism represented by the plunger 2, as by having a ratchet wheel 42 thereon operated intermittently by a ratchet lever 43, which is connected to the plunger 2 by means of a link 44. The caps, in passing from the feeder casing to the conveying chute 10, are not controlled in their position, so that some will face in one direction and some in the other direction. It is absolutely necessary, however, that when the caps come to the cap-affixing mechanism by means of the chute 28, the concave side shall face

downwardly, and inasmuch as the chute 28 turns from a vertical position to a substantially horizontal position, this necessitates that the caps, when they enter the chute 28, shall face with their concave surface outwardly. In order to obtain this result, the caps, as they pass from the conveying chute 30 to the chute 29, must be manipulated so that they will all face in the direction of the cap indicated at 45 in Fig. 11. As has been previously stated, and as will be more clearly seen from Figs. 6, 7 and 11, the chute 30 has its greatest length extending in a plane substantially at right-angles to the plane of greatest length of the chute 29, there being provided, however, at the top of the chute 29 sufficient moving space for the caps to change from a vertical position to a horizontal position, or from a position in a substantial vertical plane to a position in a plane extending at right-angles to their original position. In order to accomplish the turn in such a manner that the caps will all fall with their concave surfaces uppermost and outermost, there is provided a deflecting ridge 46, which is arched so as to engage the portion of the cap of greatest diameter and deflect it to one side or the other, according to the way it is presented to the ridge in coming from the chute 30, so that the cap will always fall with its top side down, that is to say, with its concave side uppermost. By this simple means, the caps are always presented in proper relation to the cap-affixing mechanism represented by the plunger 2. This operation, however, would be rendered inoperative or at least disturbed if the caps from the chute 30 were permitted to come in unlimited quantities down to the chute 29, as they would pile up and soon fill up the space located at the top of the chute 29. In order to prevent this, there is provided an escapement 47, which controls the passage of the caps from the chute 30 to the chute 29. This escapement is shown in the form of a lever pivoted intermediate its ends and provided at opposite sides of its pivot with pins 48 and 49, which project into the chute 30 and are spaced apart a sufficient distance to engage juxtaposed caps rolling erect in the chute 30. One end of the lever 47 projects beyond the point of connection of the pin thereto, and is engaged by a bell crank lever 50, which controls its operation. This bell crank lever 50 is pivoted at 51, and is normally pulled inwardly by a spring 52, so that a pin 53 thereon projects to its innermost position in the chute 29 except when it is prevented by a cap, such as the one indicated at 45 in Fig. 11, blocking its inward movement. The lever 50 is adapted to be actuated against the tension of the spring 52 by a cam 54 on an arm 55 engaging a lug 56 on the lever 50. This arm 55 can be manipulated in any suitable manner from the capping mechanism, as by being operatively connected to the movable chute 28. One form of such a connection is shown in Figs. 9 and 10, where an extensible or adjustable bracket 57 on the chute 28 engages an overturned lug 58 on the arm 55. The arm 55 is normally held in its lowermost position by a spring 59. The arm 55, in addition to controlling the release of the caps by the pin 53 and the pins 48 and 49, also controls the release of the lowermost cap to the capping mechanism, by having a cam 60 thereon, which engages a lug 61 on a control 62, which is shown to comprise a pivoted lever 63, having a pin 64 thereon which projects into the interior of the passage of the chute 29 and is normally forced in its inwardly-projecting position by a spring 65.

The compensator for supporting the bottles will now be described. This is shown to include a support 66 having an adjustable head 67 connected to the body of the support by a screw-threaded connection and adapted to be locked in any adjusted position by an adjustable locking hand-nut 68. The body of the support is slidingly mounted so as to move in a vertical direction in a casing 69 located on an extension frame 70 on the standard 1. This frame may be provided with a door 71, whereby access to the interior thereof can be had, so as to repair or adjust the mechanism contained therein. It will be noted that the casing 69 has, in addition to the opening through which the support extends, a considerably larger cylindrical cavity 72, whereby an enlarged portion 73 on the support may be utilized as a piston to entrap air between this enlarged portion and the overhang of the casing 69, so as to retard the return action of the support caused by mechanism to be described. An air inlet 74, controlled by a one-way check valve 75 permits the air to come into this entrapping chamber above the piston on the support, so as to allow the support to be depressed under an excessive capping pressure without any retarding effect. The support 66 is normally held stationary under the capping action, and only yields under abnormal pressure due to an excessively long bottle. In the event of an excessive pressure, means is provided for a downward yielding action of the support, which taken with the support, forms a compensator. The support 66 has a downwardly-projecting extension 76, formed with oppositely-disposed arms 77, on which are rotatably mounted anti-friction rollers, which engage in cut-out portions or grooves on the inwardly-disposed corners of arms 78 pivoted at their lower ends so as to converge inwardly toward each other. These arms form substantially rigid struts, which support the support in a stationary position, but incline, so that under an exces-

sive pressure, they will yield outwardly and permit the lowering of the support against the resistance of a spring 79, which presses upwardly on a lug 80 located on the bottom of the extension 76 of the support. The pressure at which the arms 78 yield is controlled by springs 81, which engage the arms 78, and their tension in turn is controlled by adjusters 82, shown in the form of screws having a screw-threaded connection with bosses 83 on the frame 70. The adjusters 82 may be locked in any adjusted position by locking nuts 84. It is to be noted that the angle at which each of the cut-out portions or grooves adjacent the corners of the arms 78 extend determines the pressure acting on the support 66 which will cause these arms to move away from each other against the pressure of the springs 81; it is obvious, therefore, that the particular construction of the corners of these arms may be varied under different circumstances.

The operation of the device will be readily understood when taken in connection with the above description. When it is desired to affix a cap to a bottle, the bottle, indicated as 4, is placed on the head of the support 66. This head can be adjusted to give a space between the head and the plunger 2 corresponding to the size of the general run of the bottles. When the bottle is in place, the operator presses his foot on the treadle 10, thereby causing the tripper 13 to draw the lock 15 downwardly, so that the ridge 23 thereon is withdrawn from engagement with the lug 22, so that the spring 21 will urge the clutch pawl 19 into the path of one of the lugs 20 on the rotating pulley 8. The last portion of the downward movement of the treadle 10 will cause the lug 27 to come into engagement with the tripper 13 and slip it off the dog 14, so that the lock 15 will return to its uppermost position, irrespective of how long the treadle is held in its depressed position by the operator. The pulley 8 thus carries the shaft 7 around one rotation through the intermediary of the pawl 19 on the collar 18 which is secured to the shaft 7. During the latter part of its revolution, the lug 22 on the collar 18 engages the cam or wedge surface of the ridge 23, and thus cams backwardly the pawl 19 against the tension of the spring 21, until it is withdrawn from engagement with one of the lugs 20, so that the pulley 8 will rotate freely without rotating the shaft 7. During the rotation of the shaft 7, the capping mechanism represented by the plunger 2 is moved downwardly and affixes a cap to the bottle 4, and returns to its upper position, the doors 3 permitting the affixed cap to slip from the capping mechanism. The cap which has been affixed to the bottle is replaced by another cap coming down through the chute 28 from the chute 29. This is done by the return motion of the plunger, which carries the chute 28 upwardly with it. In rising, the bracket 57 on the chute 28 raises the operator 55 against the tension of the spring 59, so that the cam 60 actuating the control 62 withdraws the pin 64 from its projecting position within the chute 29, so that the lowermost cap can fall down into position above the doors 3, ready to be affixed to the next bottle. The movement of the operator 55 also actuates, through the intermediary of the cam 54 and the lug 56, the bell crank lever 50, so that the pin 53 releases the cap 45 with which it is in engagement, so that this cap can fall to the position occupied by the preceding cap in engagement with the pin 64. This movement also raises the pin 48 from its innermost projecting position and thrusts inwardly the pin 49 into its innermost projecting position, so that if a cap is not already in engagement with the pin 49, one will be permitted to slide down through the chute 30 into engagement with the pin 49. When the chute 28 moves downwardly in the next capping operation, the operator 55 will be drawn downwardly by the spring 59 and by gravity, so that the spring 52 is free to act on the lever 50. If there is no cap in front of the pin 53, this spring 52 will draw the lower end of the lever to its innermost position, thereby raising the pin 49, a sufficient distance to allow the cap in engagement therewith to fall down to engagement with the pin 53. If, however, a cap is already in front of the pin 53, showing that there are more than enough caps in the chute 29, the pin 53 will not be permitted to travel too far inwardly by the blocking action of the cap, as indicated at 45 in Fig. 11, thus preventing the pin 49 moving outwardly a sufficient distance to permit another cap to pass from the chute 30 to the chute 29. This arrangement prevents the accumulation of an excessive number of caps in the chute 29, and thus prevents the derangement of the facing control for the caps, which tends to face the caps all in the same direction.

As has been described above, the caps are supplied to the chute 30 by the rotatable frusto-conical feeder 33, which, by virtue of its radial ribs, stirs up the caps and supplies them continuously through the outlets 37 to the circumferential passage 31, clogging being absolutely prevented by the ribs and by the circumferential inclination of the second conical surface of the feeder.

If the bottle is of the normal size, to which the head 67 has been adjusted, the support 66 will remain substantially stationary under the pressure due to the capping action. If, however, a bottle above the normal size is inserted, and an excessive

pressure created, the arms 78 will yield outwardly against this pressure, permitting the support to lower against the tension of the spring 79 and the springs 83. The pressure at which the support yields can be regulated by means of the adjusters 82. When the excessive pressure has been removed, the spring 79 will return the support to its uppermost position, which action is retarded by the shock-absorber formed by the piston flange on the body of the support working in the enlarged cavity in the casing 69.

While I have shown one embodiment of my invention, I do not wish to be limited to the specific details thereof, but desire to be protected in various changes, alterations and modifications which may come within the scope of the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. A compensator comprising a casing, a support movably mounted in said casing, said casing having an enlarged cavity, said support having an enlarged portion adapted to act as a piston in said cavity, so as to retard the movement of said support, an air inlet for said cavity, a check-valve for controlling the passage of air to said cavity through said inlet, and means for returning said support to its normal position.

2. A compensator comprising a casing, a support movably mounted in said casing, said casing having an enlarged cavity, said support having an enlarged portion adapted to act as a piston in said cavity, so as to retard the movement of said support, an air inlet for said cavity, a check-valve for controlling the passage of air to said cavity through said inlet, means for returning said support to its normal position, arms engaging said support and remaining fixed under normal pressure and yielding under set pressure.

3. A compensator comprising a casing, the casing being provided with a cavity, a support movably mounted relatively to the casing, the said support entering the cavity, an air inlet to the cavity, and means for controlling the passage of air to the cavity through said inlet, and other means for returning the said support to normal position.

4. A compensator comprising a casing, the casing being provided with a cavity, the said support having an enlarged portion positioned within the cavity and adapted to act as a piston, an air inlet for the said cavity, and a check valve for controlling the passage of air to said cavity through said inlet.

5. A compensator comprising a casing, the casing being provided with a cavity, a support carried by the casing and movable relatively thereto, the support having a portion entering the said cavity and adapted to act as a piston, a check valve for controlling the passage of air to the said cavity, and a spring for returning the support to its normal position.

6. A compensator comprising a casing, a support movably mounted within the casing, the casing being provided with a cavity, and the said support entering the cavity, a check valve for controlling the passage of air to the said cavity, pivotally mounted arms within the cavity and engaging the said support, and springs for maintaining such engagement, the said support moving downwardly and moving the arms against the pressure of the said springs when the pressure on the support exceeds a set value.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARON JOHNSON.

Witnesses:

H. WHITING,

PHILIP D. ROLLHAUS.