May 29, 1923. 1,456,542

W. B. ENGLER

PACKAGING MACHINE

Filed July 20, 1917 9 Sheets-Sheet 1

Fig. 17.

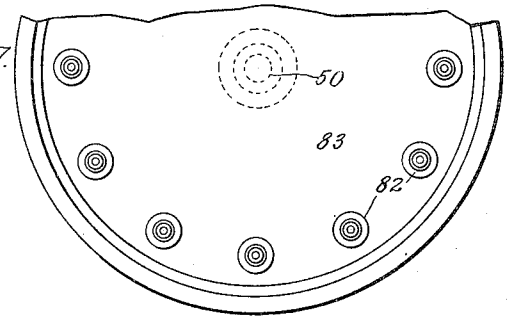
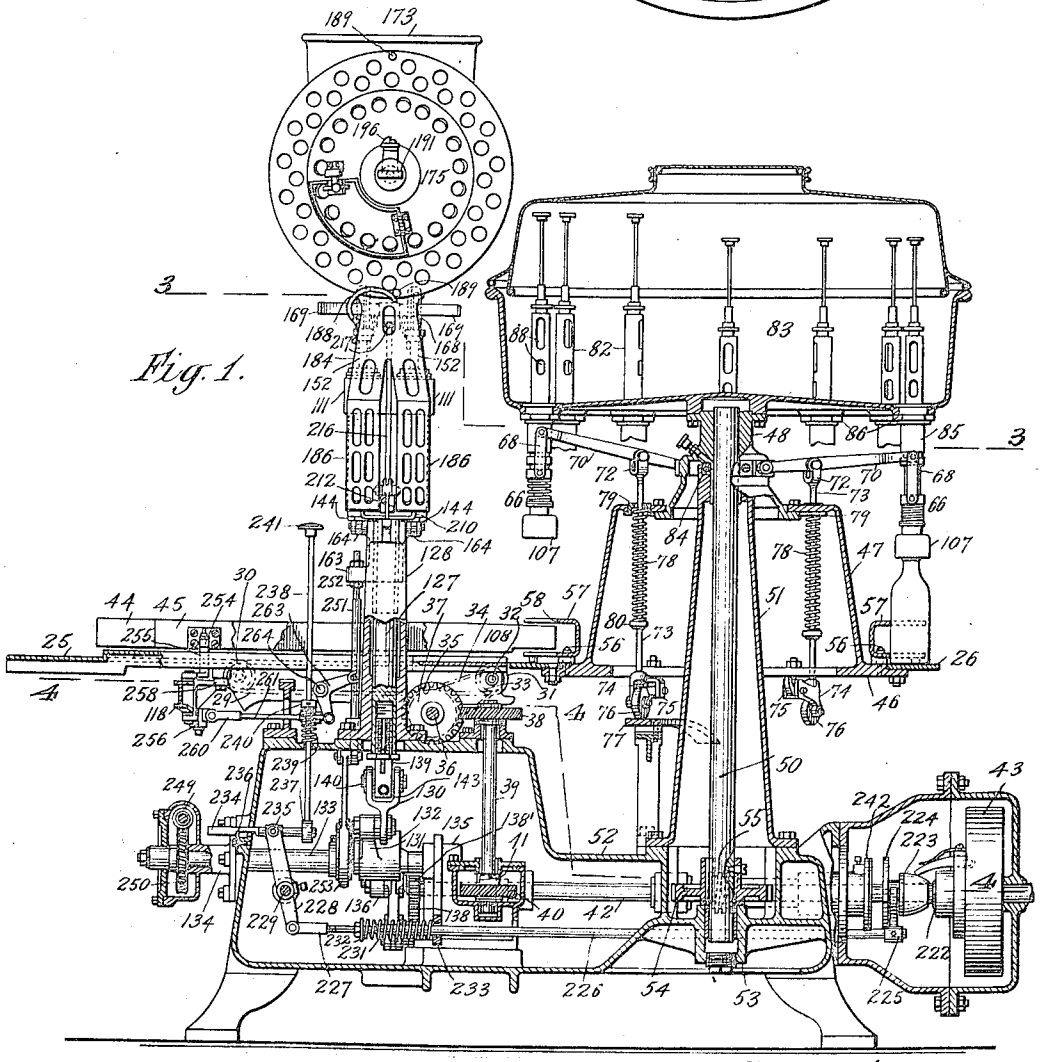


Fig. 1.



Inventor:
W. B. Engler
by his Attys:
Philip Lauzon Rice & Kennedy

May 29, 1923. 1,456,542

W. B. ENGLER

PACKAGING MACHINE

Filed July 20, 1917 9 Sheets-Sheet 2

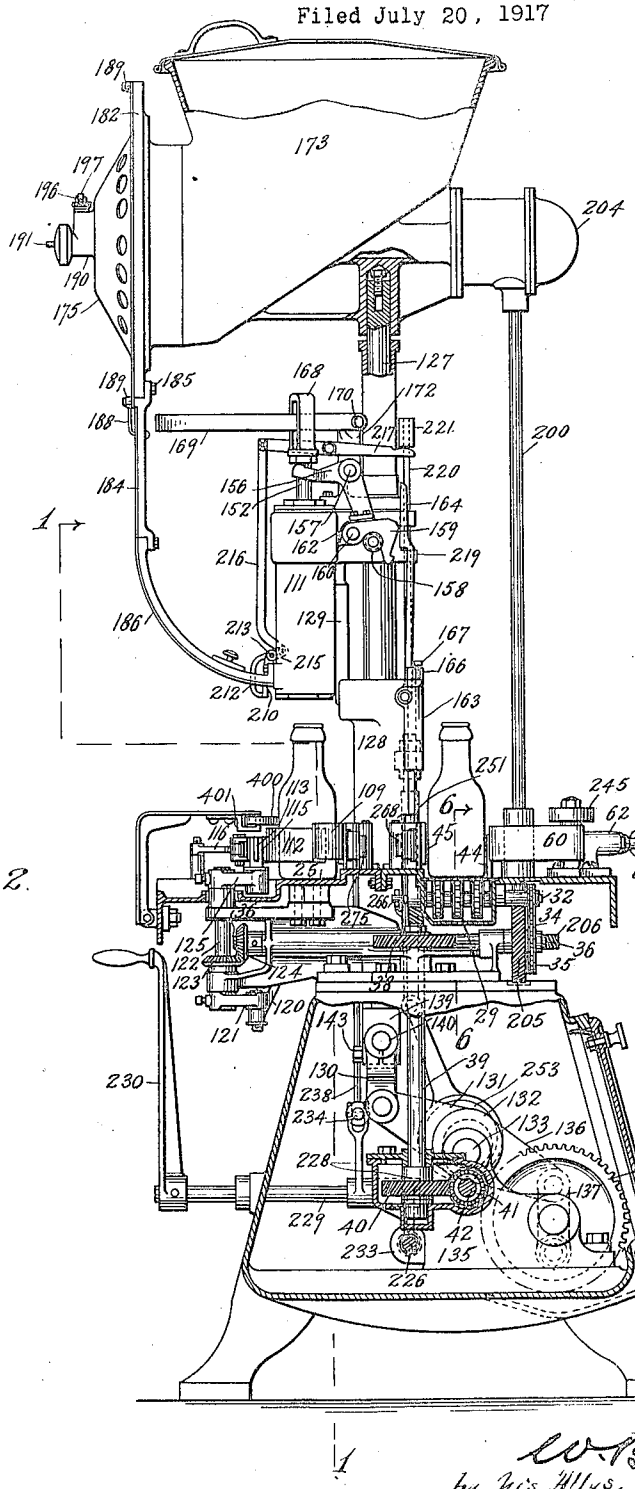


Fig. 2.

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May 29, 1923. 1,456,542

W. B. ENGLER

PACKAGING MACHINE

Filed July 20, 1917 9 Sheets-Sheet 3

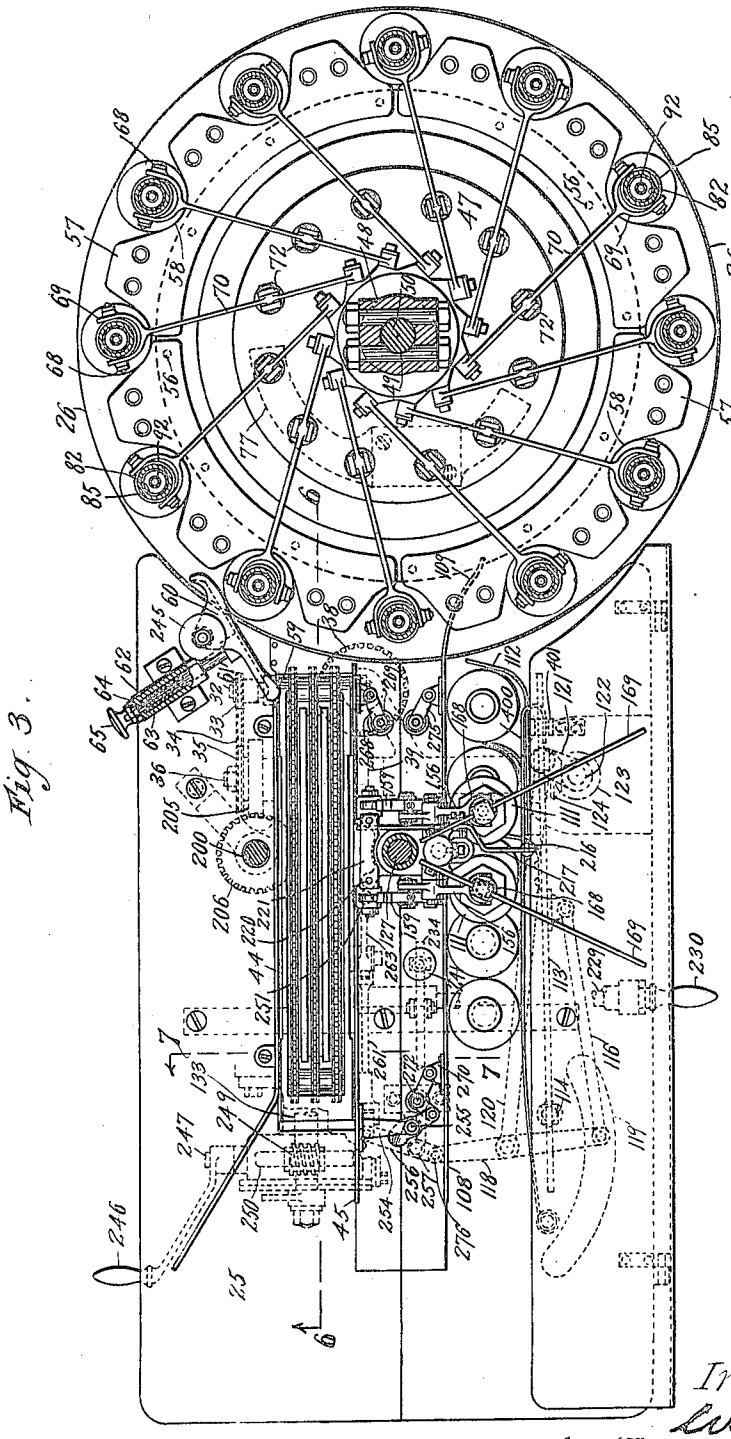

Fig. 3.

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PACKAGING MACHINE

Filed July 20, 1917 9 Sheets-Sheet 4

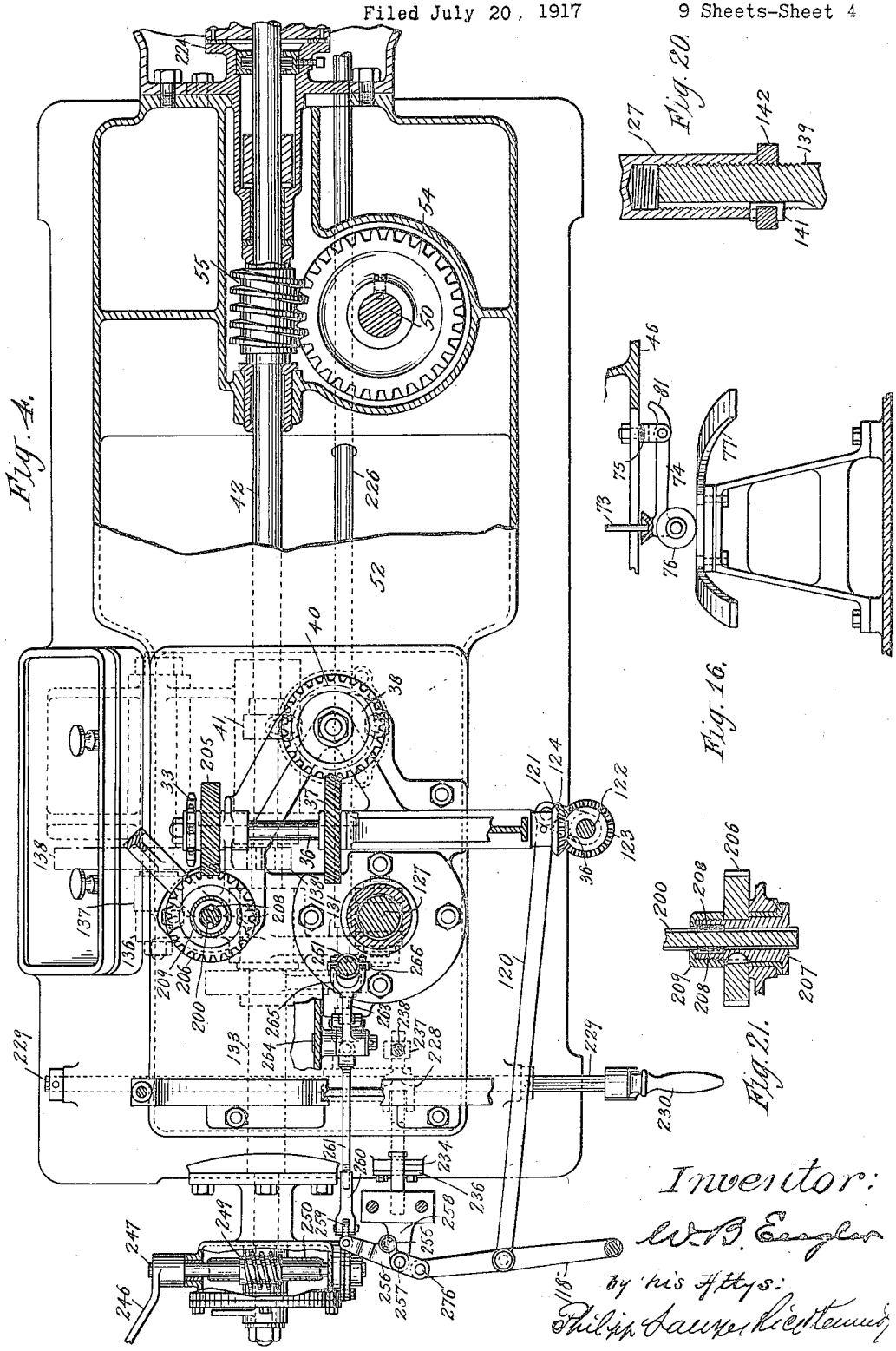

Fig. 4.

Fig. 20.

Fig. 16.

Fig. 21.

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May 29, 1923. 1,456,542

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PACKAGING MACHINE

Filed July 20, 1917. 9 Sheets-Sheet 5

Fig. 5.

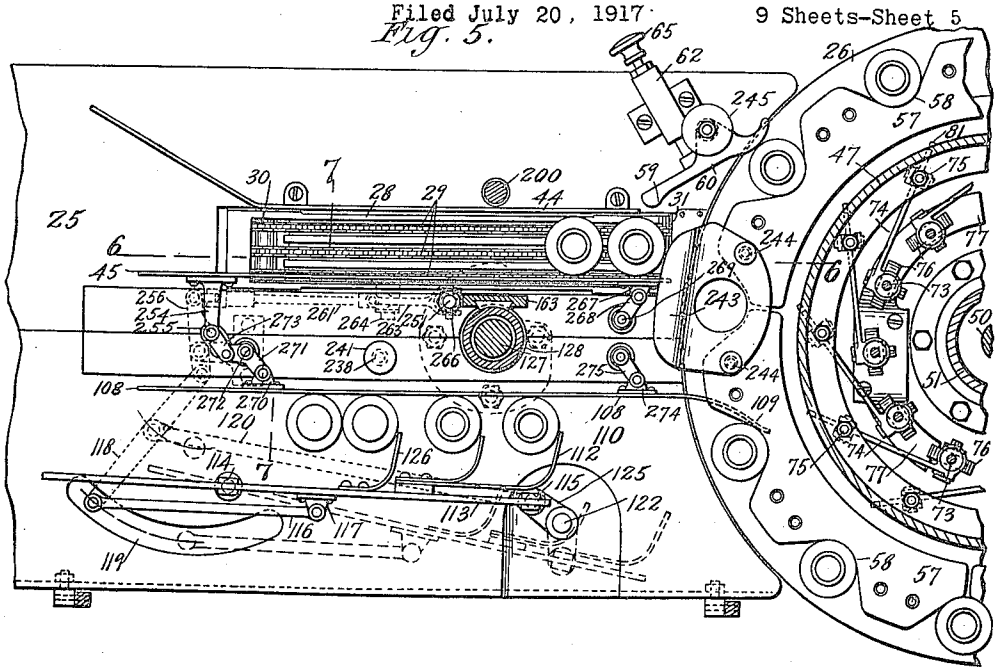


Fig. 6.

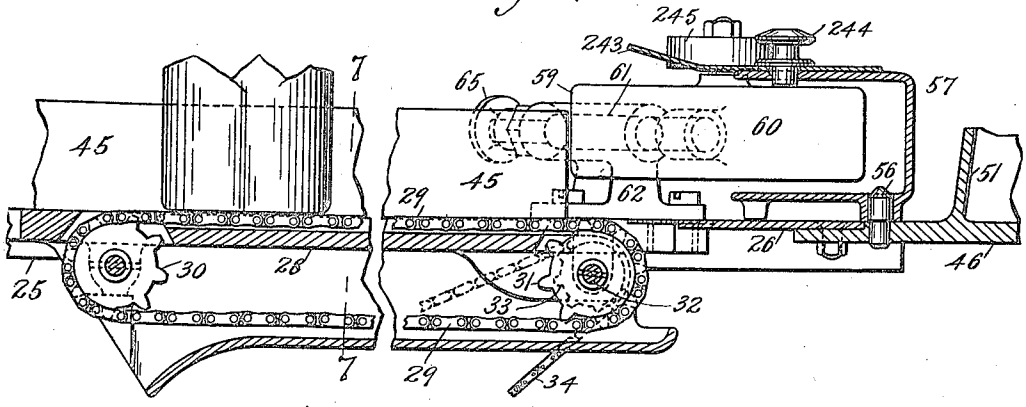
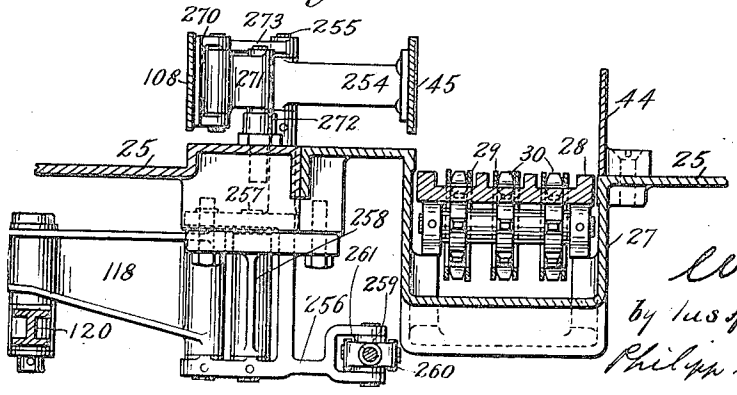


Fig. 7.



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PACKAGING MACHINE

Filed July 20, 1917 9 Sheets-Sheet 6

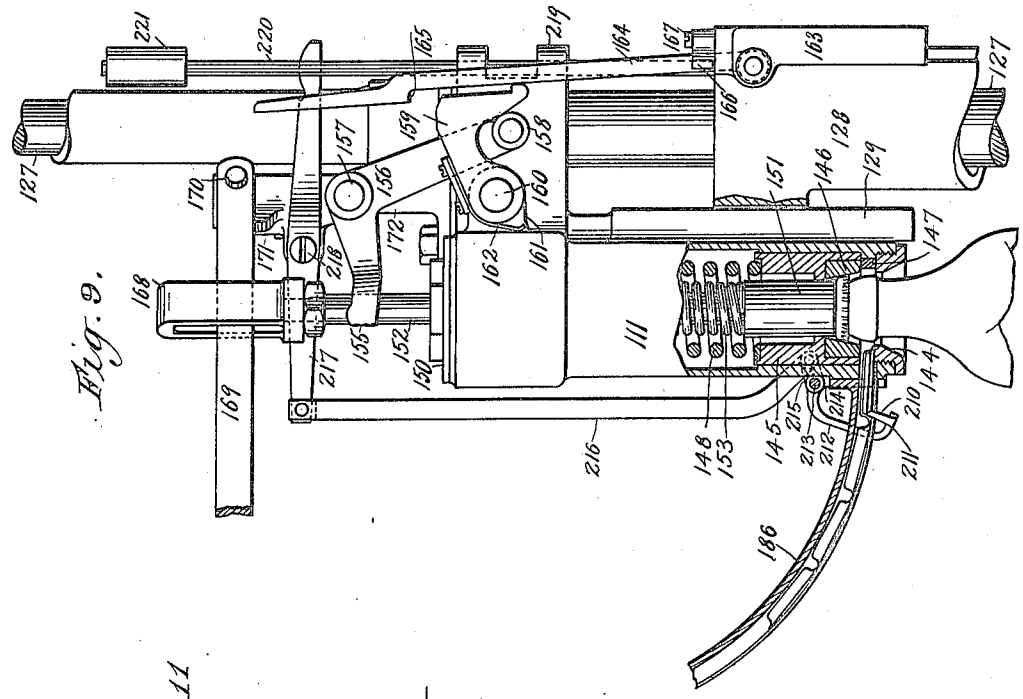

Fig. 9.

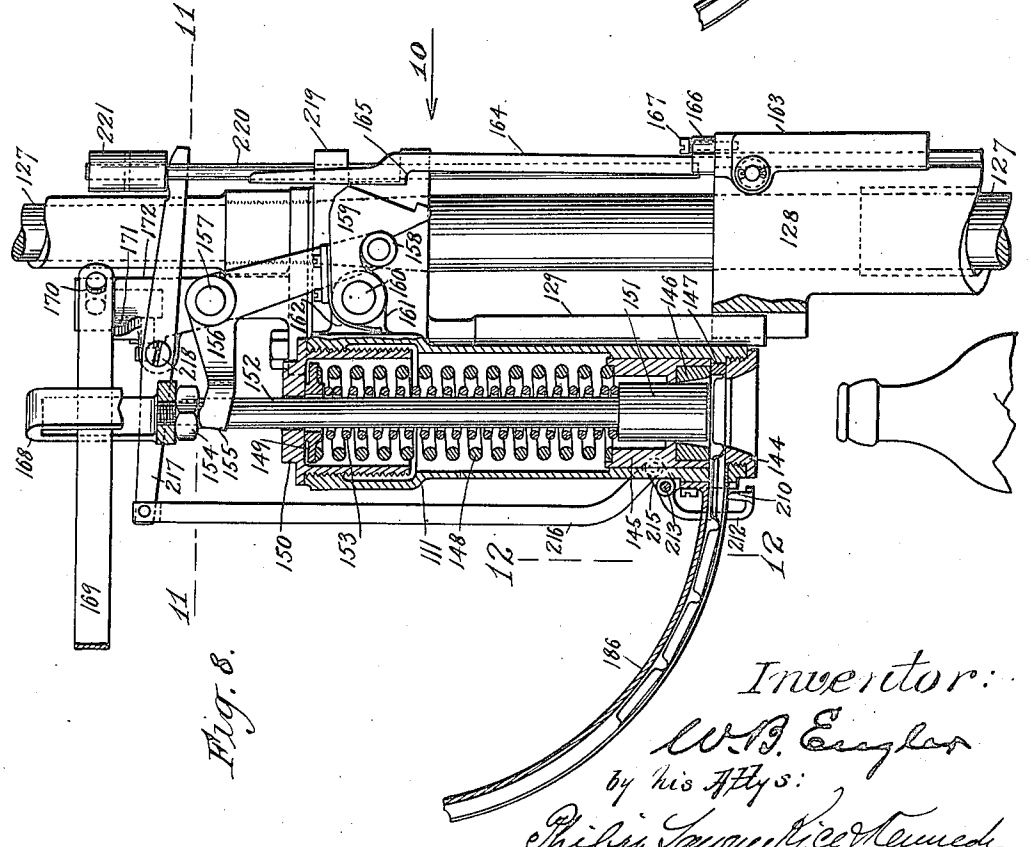

Fig. 8.

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May 29, 1923. 1,456,542

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PACKAGING MACHINE

Filed July 20, 1917 9 Sheets-Sheet 7

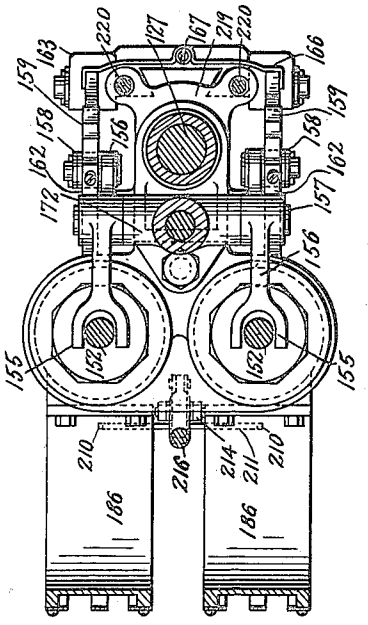

Fig. 11.

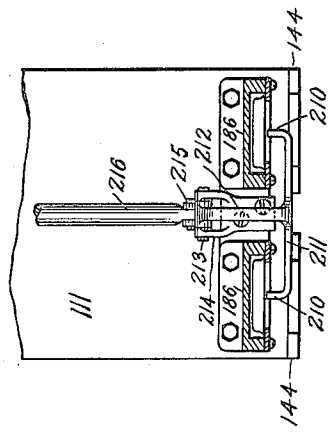

Fig. 12.

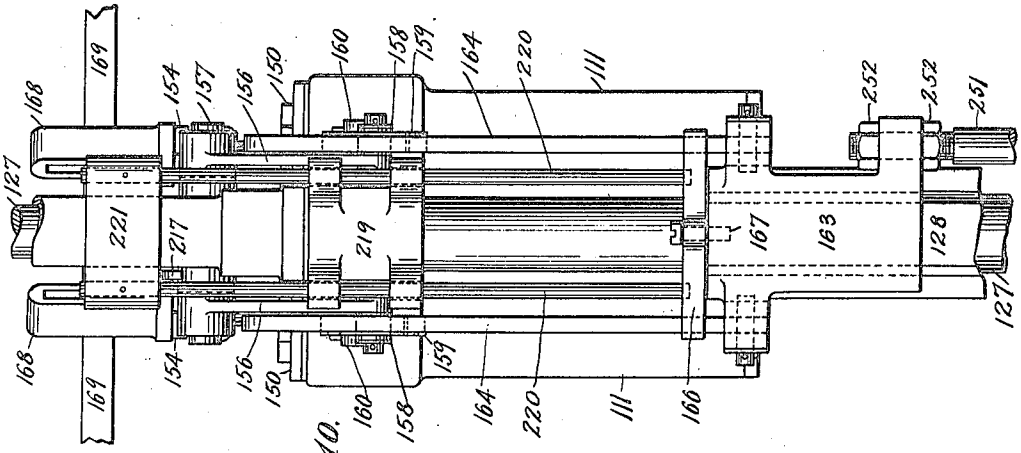

Fig. 10.

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PACKAGING MACHINE

Filed July 20, 1917 9 Sheets-Sheet 8

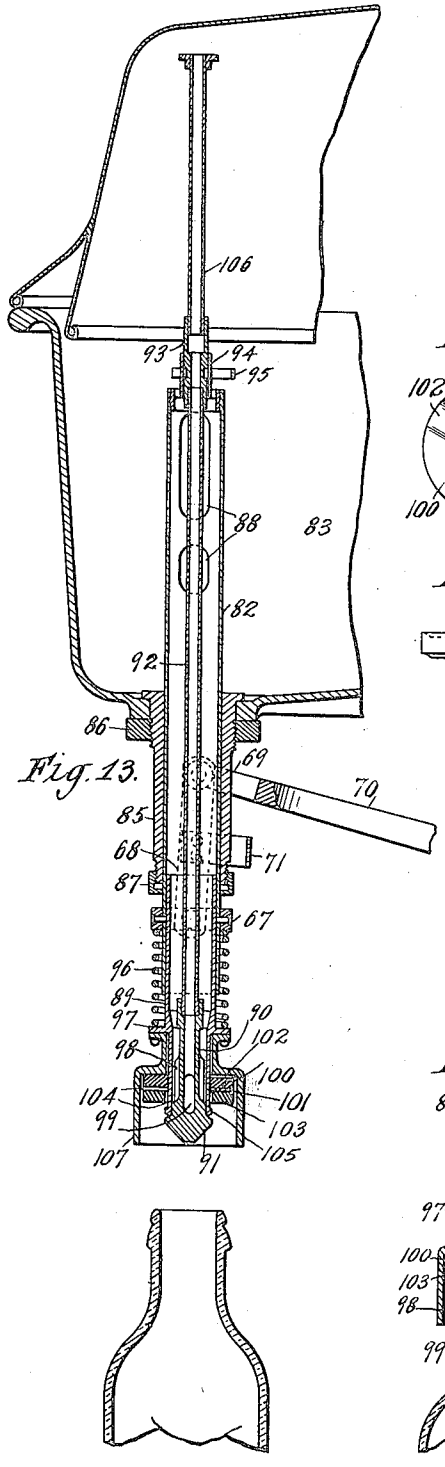

Fig. 13.

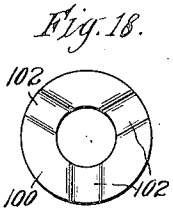

Fig. 18.

Fig. 19.

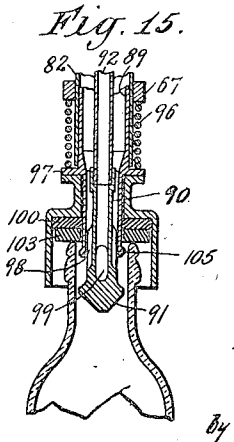

Fig. 15.

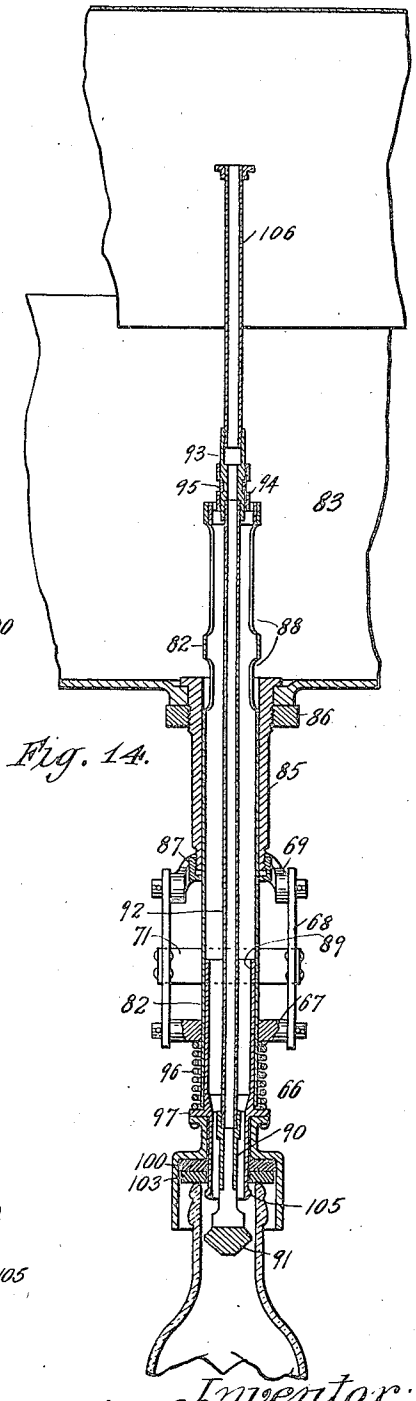

Fig. 14.

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May 29, 1923. 1,456,542

W. B. ENGLER

PACKAGING MACHINE

Filed July 20, 1917 9 Sheets-Sheet 9

Fig. 22.

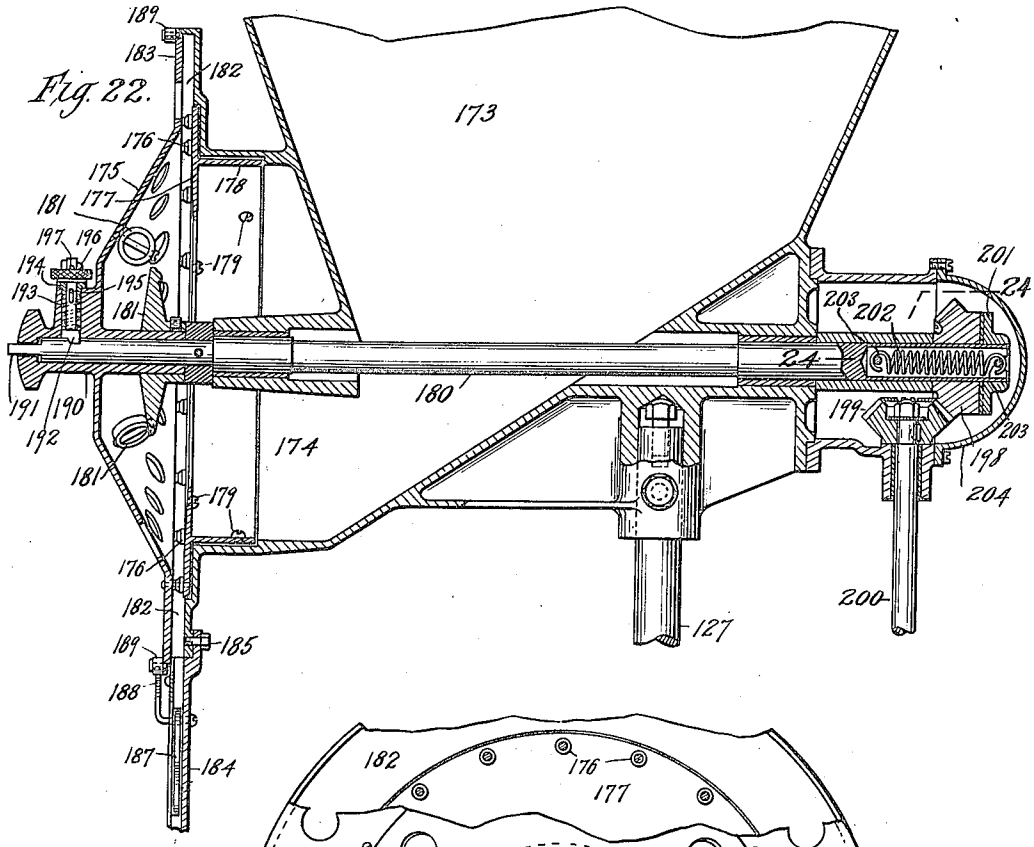


Fig. 23.

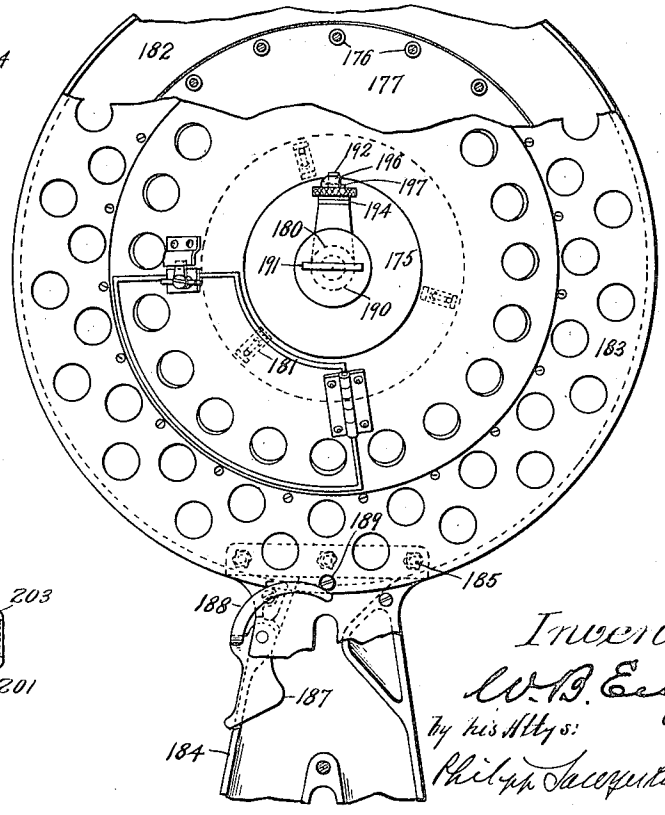
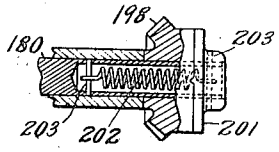


Fig. 24.



Inventor:
W. B. Engler
by his Attys:
Philipp Jacquelin Kenney

Patented May 29, 1923. 1,456,542

UNITED STATES PATENT OFFICE.

WILLIAM B. ENGLER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY OF BALTIMORE CITY, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

PACKAGING MACHINE.

Application filed July 20, 1917. Serial No. 181,680.

To all whom it may concern:

Be it known that I, WILLIAM B. ENGLER, a citizen of the United States, residing at Baltimore, State of Maryland, have invented certain new and useful Improvements in Packaging 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 packaging machines. It is an object of the invention to provide a packaging machine which automatically feeds, fills, transfers and caps bottles in a rapid and efficient manner, thereby to make possible a greater output in a given time and to do away with the necessity for a great amount of manual labor.

It is a further object of the invention to provide a machine of the character indicated that is capable of being readily and conveniently adjusted for treatment of bottles of different sizes, as, for example, quarts, pints and splits.

It is still a further object of the invention to provide a packaging machine having various improved features of construction and operation, making for a commercially successful machine, which will be apparent from the following specification and the appended claims.

With these general objects in view, the invention consists in the combinations, details of construction and arrangements of parts which will first be described in connection with the accompanying drawings and then more particularly pointed out.

In the drawings—

Figure 1 is a vertical cross-sectional view of a packaging apparatus constructed in accordance with the invention;

Fig. 2 is a view of the same in end elevation;

Fig. 3 is a cross-sectional view on an enlarged scale taken on the broken line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view taken on the broken line 4—4 of Fig. 1;

Fig. 5 is a top plan view of a portion of the machine;

Fig. 6 is a cross-sectional view on an enlarged scale taken on the line 6—6 of Figs. 3 and 5;

Fig. 7 is a similar view taken on the line 7—7 of Figs. 5 and 6;

Fig. 8 is a view in side elevation, with parts in section, of one of the capping heads, showing the same in raised position;

Fig. 9 is a similar view showing the head lowered to capping position;

Fig. 10 is a view in rear elevation of the capping heads;

Fig. 11 is a cross-sectional view taken on the line 11—11 of Fig. 8;

Fig. 12 is a similar view taken on the line 12—12 of Fig. 8;

Fig. 13 is a vertical cross-sectional view of the reservoir and filling apparatus;

Fig. 14 is a similar view showing a different section of the same parts lowered for filling with the valve open;

Fig. 15 is a detail view showing the position of the parts for smaller bottles;

Fig. 16 is a detail view showing in perspective the cam track and associated parts for raising the filling heads;

Fig. 17 is a partial plan view of the liquid-containing reservoir;

Fig. 18 is a detail plan view showing one of the sealing gaskets;

Fig. 19 is an edge view of the same;

Fig. 20 is a detail view showing the device for adjusting the capping head plunger;

Fig. 21 is a detail view showing in cross-section a portion of the drive for the crown feeding apparatus;

Fig. 22 is a vertical cross-sectional view taken through the hopper and crown feeding apparatus;

Fig. 23 is a view in front elevation partly broken, of a portion of the crown feeding apparatus; and

Fig. 24 is a detail section taken on line 24—24 of Fig. 23.

Referring to the drawings, and more particularly to Figs. 3, 5, 6 and 7, bottles to be filled are manually or otherwise placed on a stationary feeding table 25 which is curved at the opposite end to conform to and register with a rotating filling table 26. There is provided means for automatically transferring bottles from the feeding table to the filling table in spaced relation and for centering them thereon beneath the filling heads. While this may be accomplished in

various ways, in structures embodying the invention to the best advantage, the bottles are carried, indiscriminately spaced, by a conveyor toward the filling table in a manner tending to transfer them to the filling table, and a stop is provided which permits such transfer only at regular spaced intervals. Although capable of a wide range of constructions, in the embodiment shown, the table 25 has a trough-like portion 27, at the top of which is supported a conveyor frame 28. Located in this trough, so as to extend slightly above the frame 28, as appears in Fig. 7, is a plurality of conveyor chains 29, travelling toward the filling table. At the bottle-receiving end these chains pass over idler sprockets 30, and at the other, which is in proximity to the filling table, they pass over sprockets 31 on a shaft 32 carrying a sprocket 33 driven by a chain 34 which is in turn driven by a sprocket 35 on a cross-shaft 36. This shaft 36 is driven through intermeshing spiral gears 37 and 38 by a short vertical shaft 39 having a spiral gear 40 meshing with a pinion 41 on a horizontal power shaft 42 driven by a pulley 43 suitably connected with a power source. As the mass of bottles is pushed onto the feeding table, the bottles are taken by the conveyor chains and are centered thereon in single succession by a guide wall 44 secured to the table 25 on one side of the conveyor, and a guide bar 45 carried, as hereinafter described, on the other side of the conveyor, these two guide members forming a lane through which the bottles travel, the width of which is approximately the diameter of the bottles. The conveyor chains thus carry the bottles one by one toward the filling table positioned as to their path, but indiscriminately spaced. The filling table 26 is an annular bottle support bolted to the flanged portion 46 of a table support 47 which is suspended from the skirt of a supporting member 48 secured by bolts 49 to the upper end of the filling table shaft 50. This shaft, which has an upper bearing in a standard 51 carried by the base 52 of the machine, and a lower bearing 53 provided by the base, as shown in Fig. 1, is rotated by a worm gear 54 mounted on the shaft and meshing with a worm 55 mounted on the power shaft 42. Secured to the flange 46 of the table support by dowel pins 56, is a plurality of curved channel pieces 57 recessed at spaced intervals, to form a number of U-shaped centering guides 58 for positioning the bottles beneath the filling heads. The bottles are automatically placed in the embrace of these guides to be properly positioned for filling. The bottles in the feeding lane are advanced by the conveyor chains and their movement tends to transfer them to the filling table. They proceed until the leading bottle is stopped by the end 59 of a feeding member 60 which extends into the feeding lane. This feeding member is a curved plate of the form shown in the drawings and acts on the bottles to center them in the embrace of the guides and is acted on by them to displace the stop to permit transfer of the following bottles. In order that the bottle stop may be withdrawn to permit a bottle to pass over to the filling table, the member 60 is carried on the end of a rod 61 slidable in a bracket 62, which is attached to the stationary table. The rod 61 is yieldably retained in normal stopping position by a spring 63 bearing against the end of the rod and against a bushing 64 affixed to the bracket 62 to limit the movement of the rod under the force of the spring. After the first bottle has passed, the stop is removed automatically by the bottles themselves. It is assumed that a bottle has just passed to the filling table and the feeding member is in its normal stopping position, thus holding back the next bottle. As the filling table rotates, the first bottle comes in contact with the feeding member 60, and sliding over the surface of the latter is thereby directed into the U-shaped recess of the table guide which centers it under the capping head. Further rotation of the table brings the bottle and feeding member into the relation shown in Fig. 3, with the bottle forced up into the guide, so that in order that the bottle may pass, it must push back the feeding member against its spring. This displacement of the feeding member withdraws the stop end 59 from the path of the bottles in the feeding lane, thus permitting the next bottle to pass onto the filling table. The feeding member 60 is so designed that the first bottle holds it back only long enough to permit a single bottle to pass at a time, whereupon, being free to return under the force of the spring, it again moves into normal position to stop the next bottle. To withdraw the stop to permit the first bottle to pass over to the filling table the rod 61 is moved manually by means of a knob 65 on the rod which also acts as a stop against the bushing 64 to limit the forward movement of the rod under the force of its spring. It is noted that, due to the construction described, the bottles are transferred to the filling table in spaced relation, corresponding to the spacing of the centering guides and that the individual transfers are synchronous with the movement of these guides.

The bottles being thus centered on the table are automatically filled while being carried around with the table. Over each bottle is a filling head 66 and there is provided means for reciprocating these heads down to and away from the bottles during the revolution of the filling table and in structures embodying the invention to the best advantage, the head, on the down stroke,

is impositively impelled and is stopped by contact with the bottle, so that the operation is equally effective for bottles of different sizes. Although capable of various constructions, in the form shown each head is carried by a yoke 67 connected by links 68 with the yoked end 69 of a lever 70 pivotally mounted on the supporting member 48 as appears in Fig. 3. To provide ready disassemblage of the parts, these links 68 have suitable holes which are merely slipped over conical pins on the two yokes, the links being held in place by a bow spring 71. To reciprocate the levers 70 for moving the heads, each lever is pivoted within the yoked end 72 of a push rod 73 which has a sliding bearing in the top of the table support 47. At their lower ends, these push rods are attached to yoked lifting members 74 (see Figs. 1 and 16), which are pivoted to brackets 75 suspended from the flange 46 of the table support and which carry rollers 76 travelling over a cam track 77. This cam track has a raised portion corresponding with that portion of the filling table at which the bottles enter and leave and, as the rollers 76 ride up the track, the rods 73 are pushed up by the lifting members 74, thereby elevating the levers 70 which in turn raise the filling heads. The filling table having revolved far enough to permit a bottle received from the feeding table to be centered as before described, the roller for the corresponding filling head rides down off the raised portion of the cam track and the push rod is free to descend. To give the head an impositive and indefinite stroke, the push rod has associated therewith a long, coil spring 78 which bears at the top against a guide 79 carried by the table support and at the bottom against a collar 80 mounted on the push rod. During the upstroke of the push rod, this spring is compressed and as soon as the rollers 76 rides off the elevated portion of the cam track, the force of the spring depresses the push rod, thus depressing the lever 70, which in turn lowers the head. This descent of the head continues until the head engages the bottle, as hereinafter more fully described, and as also appears hereinafter, the flow of liquid is not permitted until after such contact regardless of the precise stroke made by the filling head. Due to this construction, the operation is equally effective regardless of the size of bottle used. If, for example, a quart bottle is being filled, the impositively impelled stroke of the head ceases upon sealing contact with the bottle. On the other hand, if a pint bottle is used, the construction is such that the head is lowered that much further until sealing contact is made with that bottle.

The cam track 77 extends around only that part of the table where the heads are to be raised, so that elsewhere the rollers are unsupported. To prevent the heads from descending too far in case a bottle should not be present, means is provided for limiting the downward movement of the heads beyond the range of the smallest bottle to be used. While this may be accomplished in various ways, in the form shown, the lifting members 74 carry stop fingers 81 which are elevated as the push rods descend and if such descent reaches a given point, such stop fingers come in contact with the flange 46 of the table support, thereby preventing any further movement. Thus the heads have an indefinite stroke within the range of the various bottles used but are prevented from having a down stroke substantially greater than is required for the smallest size bottle.

There is provided means whereby the liquid being packaged is automatically permitted to flow into the bottles after the head has descended and for cutting off the flow prior to the rising of the heads, and, in structures embodying the invention to the best advantage, this filling will start at a given time after the head has made contact with the bottle. While capable of a wide range of constructions, in the form shown, that part of the head to which the yoke 67 is attached, is a valve tube 82 which extends up into a liquid reservoir 83 bolted to the supporting member 48, the weight being taken by the ball-thrust bearing 84 on the standard 51. This valve tube slides in a guide 85 screwed into the bottom of the tank and secured thereto by a nut 86, a liquid-tight joint being provided at the bottom by a packing nut 87. The valve tube is open at the bottom and near the top it has a number of lateral openings 88 for the admission of the liquid in the reservoir. Telescoping and freely slidable within the lower end of the valve tube, so as to be in effect a continuation of the same, is a valve cage 89 open at both ends, the lower end carrying a resilient gasket, hereinafter described, which engages the mouth of the bottle to effect a seal. This valve cage is normally closed, and the movement thereof is controlled or permitted, by a valve 90 having a conical head 91 seating against the bottom of the cage. The movement of the valve is governed by the push rod 73. To this end the valve member is screw-threaded at its upper end to receive the end of a vent tube 92 which is connected with the valve tube to be moved thereby. The vent tube, which, as appears in Figs. 13 and 14, passes up within the valve tube, is provided with a sleeve 93 having therein an annular groove registering with a slot in a guide member 94 in the top of the valve tube, and a spring cotter pin 95 is passed

through the slot and groove. This construction not only connects the two parts to move together, but makes disconnection for cleaning and the like convenient. It will be seen that when the valve is raised, its contact with the valve cage raises the latter also. On the down stroke, the cage is free to follow the valve, and to induce this movement of the cage, a coil spring 96 is provided which bears against the yoke 67 and against a shoulder 97 on the cage and which is under some initial compression. This spring pushes down the valve cage to follow the valve as the latter descends. Due to the construction described, the head is moved by means of a member connected with the valve tube. This makes possible an operating connection below and outside of the reservoir.

Means is provided for causing the liquid to be delivered to the bottles in such manner that it is directed against the side of the bottles in a thin film, thus largely eliminating the "forming" which proves troublesome with liquids such as milk. While this may be accomplished in various ways, in the form illustrated, in the stem of the valve 90 are cut two diametrically located longitudinal recesses 98 of the form shown in Figs. 13, 14 and 15, these recesses forming liquid admission passages which terminate in an outward curve. As appears in Fig. 15, when the valve is opened, part of these recesses is still within the cage, so that valve member and cage form small passages for the liquid beyond which passages are the outwardly curved recesses. By this construction the liquid flowing down through the valve tube and cage is delivered against the side of the bottle in a thin film.

In packaging machines as heretofore known, annoyance and inconvenience have been caused by the liquid dripping from the filling heads as heads and bottles separate. There is provided means for preventing this dripping, and in structures embodying the invention to the best advantage, both liquid admission and air exit passages are closed at the lowest point thereof. While capable of various constructions, in the embodiment shown, the valve head 91, which is an imperforate conical member, seats against the bottom edge of the valve cage and the liquid admission passages terminate above this seat. The air vent tube 92 is connected, as before described, with the cylindrical portion of the valve member 90 and communication between this tube and the bottle is obtained by two transverse air exit ports 99 formed in the side of the valve and opening into the cylindrical portion, these ports being located above the valve seat. Consequently, when the valve is closed against its seat, both liquid and air passages are closed at their lowest point, and liquid in the liquid passage or any liquid which may arise in the air passage during filling, cannot drip after the head and bottle are separated

Means is provided whereby a seal is effected between filling head and the bottle and for venting the bottle after filling and while the head is still in contact with the bottle, thereby to prevent lifting of the bottle, without the use of mechanical brakes and the like. While the construction of such sealing and venting means may be varied, in the construction illustrated the lower end of the valve cage carries a two-part resilient gasket comprising two rubber rings. The upper ring 100 is made to fit snugly on the cage and is provided on its lower face with a plurality of equally spaced radial ribs 101, and on its upper face with corresponding grooves 102. The lower ring 103, which makes contact with the rim of the bottle, has flat faces and the diameter of its central opening is somewhat larger than the diameter of the valve cage, so that there is provided an air passage 104 between the lower ring and cage and between the two rings. The loose fitting portion 103 of the gasket is prevented from falling off when the head is raised by a flaring flange or rib 105, formed at the foot of the valve cage.

In the filling operation the levers 70 are operated to raise and lower the heads, as before described. As the valve tube descends, the air tube, carrying the valve, descends also, being connected therewith, and the cage, free to follow, descends under the force of its spring, this movement continuing until the gasket ring 103 contacts with the bottle, whereupon the valve cage stops. The cage, however, has a telescoping relation with the valve tube, so that further movement of the latter is, as yet, unrestricted, and during this further movement the pressure derived from the push rod spring 78 presses together the two parts of the gasket and flattens out the ribs on the gasket ring 100 to close part of the air passage 104, thereby effecting a seal between head and bottle. The stroke of the head continues, the valve tube telescoping over the cage and compressing spring 96, until the bottom of the tube strikes the stop formed by shoulder 97 on the cage, which terminates the stroke of the head. This movement of the valve tube, following the stopping of the cage, obviously moves the valve away from its seat, and at the stopping point the valve is fully opened, the liquid flowing down the passages 98 in a thin film, and the displaced air passing out the ports 99 to the air vent tube 92. In order that the top of the air vent tube may always be above the level of the liquid in the tank and to facilitate disassembly, the vent tube has an extension 106 which has a slip fit in the sleeve 93. As the

lifting lever 70 starts its upstroke, the valve tube and valve will ascend alone, releasing compression of spring 96 until the valve head again seats against the bottom of the cage. At this point, the bottle is completely shut off from the atmosphere. Further ascent of the valve, however, takes the pressure from the two-part gasket and before the latter is pulled away from the bottle, its inherent resiliency causes the ribs 101 to return to normal shape, thus opening the air passage 104 and venting the bottle. This venting of the bottle prevents the possibility of the bottle being lifted by the slight suction created. Further upward movement of tube and valve carries the cage with the valve, and the entire head is lifted clear of the bottles, dripping being prevented, as before described.

To downwardly direct any liquid emerging from a possibly broken lipped bottle, the cage carries a guard 107 which has a skirt extending down far enough as to surround the top of the bottle in filling position, as shown in Fig. 15.

Structures embodying the invention in its entirety include means for automatically transferring the filled bottles from the filling table to the capping table and for automatically centering the bottles under the capping heads in properly spaced relation. Although this may be accomplished in various ways, in the embodiment shown, carried by the stationary table 25, which also serves as a capping table, is a bottle deflecting guide bar 108 which has a curved portion 109 extending into the path of the bottles on the filling table. As the bottles reach this deflecting guide one by one, they are, by contact therewith, transferred to the space 110 on the stationary table. The transferring and spacing mechanism for placing the bottles in capping position, is designed to simultaneously carry up to the capping heads as many bottles as there are heads. In the present embodiment, two capping heads 111 are shown and two bottles are simultaneously advanced. When two bottles have entered space 110, they are engaged respectively by two carrier arms 112 which are spaced apart the distance of the capping heads and these arms are operated to carry the two bottles up to capping position and thereafter to return for the next two. These arms are secured to a bracket bar 113 which moves in an approximately elliptical orbit to move the arms away from the bottles just centered and to bring the arms up behind the next two bottles preparatory to transferring them. To provide this stroke, the bracket bar 113 is given an endwise and a lateral motion. The bracket bar slides in pivoted guides 114 and 115 and the endwise motion is derived from a connecting rod 116 which is attached to a bracket 117 on which the bar 113 is mounted, this connecting rod being pinned to a lever 118 located beneath the table. The table is provided with a suitable curved slot 119 to allow for the movement of the pin. This lever is fulcrumed on a member hereinafter described and is reciprocated by a link 120 attached to a crank 121 revolving on a shaft 122 driven through intermeshing gears 123 and 124 by the cross-shaft 36. To provide the lateral movement of the bar, the shaft 122 also carries a crank 125 on which is pivoted the guide 115. Thus the ratchet bar 113 is given a longitudinal movement by crank 121, the bar sliding in the brackets 114 and 115, and the rotation of guide 115 by crank 125 also gives the bracket bar a lateral movement as it is sliding through that guide, both guides being pivoted to accommodate the movement of the bracket bar. The combined effect of this double movement is such that the bottle-engaging arms move in a path approximately elliptical, as will be clear from the full and broken line position shown in Fig. 5. By this motion, the carrier arms are brought up behind the two bottles in the space 110 and then move these bottles over toward capping position. During this movement the spaced bottles are centered by being slid along in contact with the guide bar 108. To insure this contact, a long spring 400 is provided which tends to force the bottles toward the guide bar. This spring is pivoted at one end, as shown in Fig. 3, and the other end is bent back upon itself and passes through a bracket frame 401. This holds the end in a manner to permit the necessary amount of play to prevent the spring from swinging out too far. The end of this stroke of the carrier arms brings the bottles to a position beneath the capping heads, whereupon the arms move away to clear the bottles and make their backward inoperative stroke preparatory to engaging the next two bottles, and during this back stroke the bottles are capped as hereinafter described. Means is provided for removing the capped bottles from capping position and in structures embodying the invention to the best advantage, the capped bottles are removed by the same operation that advances the uncapped bottles. To this end, as shown in the present exemplification, the bracket bar 113 also carries an arm 126 positioned to engage the back of the second bottle just capped on the stroke of the bracket bar which brings up the next two bottles. This pushes the two capped bottles away from capping position, as shown in Fig. 5. These bottles are pushed along by succeeding bottles until they reach a point where they may be removed from the table in any manner desired. The movement of the bar 113 on its back stroke brings the arm 126 into position to carry off the next two capped bottles.

These bottle-transferring arms 112 and 126 are moved in such manner that their orbit is synchronous with the deflection of as many bottles as are to be simultaneously capped. That is to say, in the present embodiment, the arms 112 and 126 travel through their orbit once for the advance of each two filling table guides past the bottle deflecting point.

There is provided means for reciprocating the capping heads. While this may be accomplished by a wide range of constructions in that illustrated, the heads 111, two in number, are carried by a vertically reciprocating plunger 127 which slides in a column 128 supported by the base of the machine, this column having suitable slots to receive the guide ribs 129 of the heads. To reciprocate the plunger, it is connected with a yoke 130 pinned to a rocker-arm 131, which is rigidly connected to a sleeve 132 mounted to oscillate on an eccentric portion of a cross-shaft 133, which has bearings in the brackets 134 and 135. Also, rigidly connected to this sleeve is a rocker-arm 136 pinned to a crank 137 on a crank gear 138 which meshes with a driving pinion 138′ on the power shaft 42. Thus, the revolution of the power shaft rocks the two rocker-arms 131 and 136 which are, in effect, a unit, and the movement thereof reciprocates the head-carrying plunger 127 through a given stroke.

In order to compensate for wear and manufacturing inaccuracies, means is provided for adjusting the stroke of the plunger 127. Although capable of various constructions, in that shown, the lower end of the plunger has an internal bore threaded to receive the threaded end of an adjusting member 139 which is secured to the yoke 130 by pin 140. The adjusting member is longitudinally slotted to receive a key 141 which also fits in a slot formed in the plunger and which is formed with arms to embrace a lock nut 142. By loosening nut 142 and displacing the key, and disconnecting member 129 from the yoke 130, the adjusting member 139 may be moved up or down relatively to the plunger, thus, in effect, decreasing or increasing the plunger's length by adjusting the effective length of the connecting member. After adjustment, the pin 140 is replaced to connect the member 139 with the yoke again and the key is moved into former position and the lock nut tightened. The construction described insures proper alignment of the parts after adjustment is made. Movement of the pin 140 endwise or rotatively is normally prevented by a bolt 143.

Each capping head, at its base, is threaded to receive a throat guide 144 and in the lower end of the head is slidably supported a throat carrier 145 which carries a tapered crowning throat 146. This throat is held in position by a horseshoe-shaped washer 147 which also serves to center the crowns. Pressure is brought to bear on the throat by means of a compression spring 148 bearing on the top of the throat carrier and against a washer 149 backed by the head top nut 150.

Means is provided for adjusting the pressure exerted on the throat. While this may be accomplished in various ways, in the construction shown the head top nut 150 is provided with a relatively long threaded skirt and by moving the top nut up or down, the spring tension is varied.

There is provided means for holding the crowns on the bottle during capping and for holding the bottle down on the table until the head clears the bottle, thereby preventing the bottle being lifted by the head. While this may be done by various constructions, in the embodiment shown, a presser-foot 151 is carried by a plunger 152 so as to be freely movable through the throat, throat carrier and throat guide, the plunger being slidable through an opening in the head top nut. This presser-foot is pressed toward the bottle by a spring 153 which bears against the shoulder formed between the presser-foot and the plunger and against the washer 149. After a bottle is capped, as the head rises, the spring-weighted presser-foot remains against the top of the bottle holding it in place until the head completely clears the bottle. It will be seen that this leaves the presser-foot extending down into the throat guide and the path of the feeding crowns. Means is provided for raising the presser-foot to a position such that the next crown can enter the throat guide, and for holding it in such raised position, and, in structures embodying the invention to the best advantage, the presser-foot is automatically raised by the latter part of the upward stroke of the head. Although capable of a wide range of construction, in the form shown the plunger 152 carries at its upper end a nut 154 designed to be engaged by the yoked end 155 of one arm of a bell-crank lever 156 pivoted on a stud 157. The other arm of the bell-crank lever carries a roller 158 which is in contact with the lower edge of a locking member 159 pivoted on a stud 160 carried by a bracket 161 on the head. This locking member has its lower edge notched, as shown in Figs. 8 and 9, so as to embrace the roller in the position shown in Fig. 8. Assuming the parts to be as in Fig. 8 with the plunger and presser-foot raised and locked in such position, the head descends toward the bottle-the parts keeping this relation until the presser-foot rests on the cap covered bottle. The head descends far enough for the bottle to cause an upward movement of presser-foot and plunger, so that the weight of the latter is taken by the bottle. This relieves the bell-crank lever

and the locking member is thereby free to swing upwardly under the force of a small flat spring 162. This places the parts in the relation shown in Fig. 9 and the presser-foot is free to perform its function as above described. To raise the plunger and again lock it in place, a bracket 163 carried by the column 128, carries for each head, a long pawl 164 which has a shoulder 165 designed to be engaged by a shoulder on the locking member as the latter rises with the head. This contact swings the locking member downwardly, the lower edge thereof riding over the roller 158 thereby to displace the bell-crank lever in a manner to cause the yoked end thereof to engage the nut on the plunger and lift the same to the position shown in Fig. 8, the roller meanwhile moving into the embrace of the notch on the locking member to lock the parts in place. It will be noted that the pawl is of such length that this action takes place toward the end of the upward stroke of the head, or, in other words, at such time that the presser-foot has performed its function and the head has cleared the bottle. To hold these pawls which are pivoted to the bracket in a position to operate properly, they are pressed in toward the locking members by a bow-shaped bar spring 166, the ends of which engage the pawls, the middle being sprung under a screw or pin 167. Means is provided whereby each presser-foot and plunger can be raised manually, independently of the automatic action described. This makes it possible to conveniently remove defective crowns and the like from the throats. While this may be done in various ways, in the embodiment shown, above the nuts 154 on the plungers are yokes 168 having relatively long slots through which pass lifting levers 169 pivoted on pins 170 and normally resting on stop shoulders 171 on a bracket 172. By lifting these levers either plunger and its presser-foot may be raised to withdraw it from the throat space. The long slots mentioned are provided in order that the manual lifting levers need not be moved unnecessarily during the normal automatic operation of the plungers.

There is provided means for automatically feeding crowns to the capping heads. Although capable of a wide range of constructions, in the embodiment shown, the top of the reciprocating plunger 127, which carries the heads, carries also a hopper 173 having the usual crown chamber 174 which is closed by a crown cage 175. Secured to the cage by a plurality of pins 176 is a selecting dial 177. These pins are so designed and spaced that crowns presented to them can pass between them only when faced in one direction. The selecting dial has a skirt portion 178 extending into the hopper chamber and carrying buttons 179 for agitating the crowns. The cage and dial are driven by a hopper shaft 180, as hereinafter described, and as they rotate, the crowns in the hopper chamber are agitated so that certain of them are lifted up over the dial into the cage. Here they are tumbled further by agitators 181 carried by the cage, and a number of crowns will be presented to the selecting pins properly faced to pass between the pins and enter the channel 182 formed between the front face of the hopper and the flange 183 of the cage. From this channel they pass through an exit into a chute block 184 fastened to the hopper as at 185, to register with the crown exit. This chute block has a forked lower end registering with two chutes 186 leading to the two capping heads and means is provided for preventing congestion of crowns in the fork of this chute block. While this may be done in various ways, in the embodiment shown, there is pivoted to the chute block to reciprocate in a suitable slot in the side thereof, a crown striker 187. This member has a curved cam portion 188 extending up outside the chute block in the path of a plurality of rollers 189 carried by the crown cage. As the cage rotates, these rollers make contact with this cam portion and swing the lower end of the striker out of the chute block. As the rollers leave the cam portion, the striker, being released, suddenly returns to its center of gravity, striking a light blow on any crowns which may be in its path.

There is provided means whereby the cage is mounted with respect to hopper and hopper shaft, so as to be readily removable for cleaning, changing the style of crown used, and the like. While this may be accomplished by various constructions, in the form shown the cage has a long hub 190 mounted to be freely slidable on the hopper shaft. To obtain a driving connection between the two, the shaft has a flattened end 191 which fits a rectangular opening in the cage. To normally retain the cage in position on the shaft during operation of the machine, the hub 190 carries a shouldered latch pin 192 which fits into a notch cut in the shaft, thereby preventing relative lateral movement of cage and shaft. This pin is held in latching position by a spring 193 bearing against a shoulder on the pin and against a bushing 194 secured to the cage hub by a pin 195 which also prevents the latching pin from turning. To withdraw the latching pin, a lifting cam 196 is mounted freely thereon, the top being out in spiral form and making contact with a pin 197 secured to the latching pin. As this cam is turned, the latching pin is withdrawn from engagement with the notch in the shaft and the crown cage is free to be slid off the shaft.

Means is provided whereby the hopper shaft is normally continuously rotated, but such that an excessive load such as that caused by the wedging of any crowns or foreign matter between the moving parts of the hopper, will cause the shaft to stop, and also such that the hopper may be manually rotated as when starting to feed crowns. Although capable of a wide range of constructions, in that shown the hopper shaft carries with a running fit a beveled gear 198 meshing with a similar gear 199 on a shaft 200 rotated as hereinafter described. The hopper shaft gear has on its back face two radial V-shaped grooves to receive corresponding tongues on a clutch member 201 normally held firmly against the gear by means of a spring 202 located in a suitable recess in the hopper shaft and pinned to the shaft and clutch by pins 203. This transmission is enclosed in a housing 204. Normally, the clutch and gear revolve as a unit, but, should a bent crown or some foreign substance become wedged between the stationary and moving parts of the feed, the added load on the hopper shaft causes the clutch to slip, whereby the hopper shaft ceases to rotate and mutilation of crowns is avoided. This construction also permits manual rotation of the cage and dial independently of the normal operation of the machine, so that the feeding may be accelerated when the machine is first started.

Means is provided for driving the shaft 200 which reciprocates with head and hopper from a stationary source of power. While this may be done in various ways, in the present embodiment the cross-shaft 36 carries a spiral gear 205 meshing with a similar gear 206 keyed to a sleeve 207. The inner wall of this sleeve has a plurality of semi-cylindrical grooves for receiving two cylindrical keys 208 which have a sliding fit in grooves formed in the shaft 200, said grooves being long enough to allow the shaft 200 to make its vertical stroke. The keys are retained in place and the gear is fastened to the sleeve by a lock nut 209.

Means is provided for preventing crowns in the feed chute from catching under the skirt of attached crowns as the heads are being lifted. Although capable of a wide range of constructions, in structures embodying the invention to the best advantage, a stop is automatically advanced into the chute to hold back the leading crown and is later withdrawn to allow the crown to pass into the throat guide. In the present embodiment, stop fingers 210 capable of passing into the chutes, are carried by arms 211 suspended from a rocker-arm 212 mounted on a shaft 213 carried by a bracket 214. Also mounted on this shaft is a link 215 attached to a connecting rod 216 pivoted to a lever 217 which is fulcrumed on a stud 218 carried by the bracket 172. It will be seen that lowering the free end of this lever swings the stop fingers into inoperative position, as in Fig. 8, and that raising of the lever swings the stop fingers up to engage the skirt of the leading crown in the chute to pull it back from and hold it clear of the crown on the bottle in the throat space, as shown in Fig. 9.

There is provided means whereby this lever is reciprocated to operate the stops by the movement of the head. While this may be done in various ways, in the form illustrated, slidably carried by a bracket 219 on the head, as shown in Fig. 10, are two rods 220 which support at their upper ends a weight 221. At the top of the stroke of the capping heads, these weights rest on the free ends of the lever 217, thereby depressing the same to throw out the stop fingers, as above described. As the heads descend, the rods come in contact with the relatively stationary bracket 163 and are thereby stopped. This removes the weight from the lever 217, and when thus released, the inherent weight of the parts is sufficient to cause the lever to swing up, thus throwing in the stop fingers to hold back the leading crown in the chutes during the capping operation, and until the head again ascends far enough for the lever to be again lowered by the weight 221. This action throws out the stop fingers and allows the next crown to pass into the throat guide.

There is provided means for quickly and conveniently disconnecting the power shaft from the source of power and for almost instantaneously stopping the machine. This may be done in various ways. In the present exemplification, Fig. 1 illustrates a clutch 222 of the contracting ring type for connecting the power shaft 42 with the driving pulley 43. This clutch has a sliding clutch spool 223, part of which is a flat plate 224. The clutch spool is moved in and out by a yoke 225 pinned to a rod 226 connected by an adjustable yoke 227 with a lever 228 mounted on a shaft 229 on which is also mounted an operating handle 230 for operation of the clutch in starting the machine. The rod 226 is normally forced in a direction tending to throw out the clutch by a coil spring 231 bearing against a washer 232 adjustably mounted on the rod and against a lug 233 on the bracket 135. For normally holding this rod against such movement, a latch is provided. The lever 228 is double-armed, its upper arm, as shown in Fig. 1, being yoked to receive a latch bar 234, which is pivoted thereto by pin 235. One end of this latch member is notched to fit over a plate 236 carried by the stationary frame of the machine and the other end is

slidably carried by an eye 237 on the end of a releasing rod 238. This rod is normally held up to retain the latch in place by a spring 239 bearing against the frame of the machine and against a collar 240 on the rod. The rod extends up above the stationary table 25 so as to be within convenient reach of the operator and it terminates in a knob or button 241. In case it is desired to suddenly stop the machine, it is merely necessary to depress the rod 238 by striking the button 241, this movement of the rod releasing the latch, thereby permitting the clutch controlling rod 226 to be displaced under the force of its spring. This movement of the clutch-controlling rod throws out the clutch, thereby disconnecting the power, and at the same time it moves the plate portion of the clutch spool tightly against a leather covered washer 242, which acts as a brake, thereby almost immediately stopping the machine. When the clutch is again thrown in by means of the operating handle, the latch member slips over the plate into latching position, thus again locking the parts for normal operation.

It sometimes happens that one or more of the filling valves will not operate properly due to leaks or the like, so that it is desirable to operate the machine without any bottles under such temporarily disabled filling heads. Structures embodying the invention in its entirety, include means for preventing any given centering guide on the filling table from receiving bottles, without interfering with the operation of the automatic bottle-feeding apparatus. While capable of a variety of constructions, in the form shown there is provided a number of emergency plates 243 which carry studs 244 designed to be inserted in suitable holes formed in the top of the guide forming members 57. As shown in Fig. 5, when one of these plates is in position, covering a given centering guide, it extends out beyond the edge of the filling table and as it passes the feeding conveyor, it makes contact with the leading bottle thereon, and thereby prevents the bottle from moving onto the filling table to enter that particular guide. Upon further rotation of the filling table, this emergency plate operates the feeding member 60 to withdraw the stop to permit the leading bottle to enter the next succeeding guide. To this end, the feeding member 60 carries a roller 245 located to be engaged by the edge of the emergency plate in such manner that the member 60 is pushed back just as it would be by a bottle under normal conditions. By this construction, the machine is operated without bottles under any given filling head or heads and yet the automatic feeding operates as normally.

There is provided means for readily and quickly adjusting the machine to adapt it to use with bottles of different sizes, as, for example, quarts, pints and splits, and in structures embodying the invention to the best advantage, substantially all of the parts, the relative position of which requires changing, are adjusted to the new relation by the manipulation of a single operating member. While the constructions whereby the various individual adjustments and the combined adjustments are made, are capable of a wide variation, in the present exemplification, there is provided an adjusting handle 246 on a shaft 247 carrying a worm 249 meshing with a worm gear 250 on the cross-shaft 133, and rotation of this shaft by means of the handle 246 causes adjustment of the relation of the following units in order that the relation of the various parts involved may conform to the height and diameter of the smaller or larger bottles: the feeding guide bar 45; the deflecting guide bar 108; the transferring arms for moving the bottles to the capping heads; the stroke of the capping heads, the pawls for causing the raising of the presser-foot plungers; and the rods for controlling the movement of the crown stops. These last two features are adjusted by changing the position of the bracket 163 which carries the pawls 164 and against which the controlling rods 220 abut. Assuming the parts as shown in Figs. 1 and 3, for example, to be adapted to the maximum size of bottles, to adjust the machine for smaller bottles, the handle 246 is operated to turn shaft 133 the proper amount, which may be indicated by a suitable dial on the end of the shaft. As before stated that part of the shaft 133, on which is mounted the rocker-arm which causes reciprocation of the capping heads, is eccentric with respect to the ends of the shaft, so that any rotative change in the position of the shaft changes the vertical position of the fulcrum of the rocker-arm. It will be seen from the drawings that the construction is such that any change in the vertical height of this fulcrum is substantially doubled at the end of the rocker-arm, consequently, a very slight movement of the cross-shaft 133 lowers the fulcrum point of the rocker-arm sufficiently to change the mean position of the stroke of the capping heads to adapt the stroke to smaller bottles. In order that the pawls which control the raising of the presser-foot plungers and the weighted rods 220 may retain their relative position when the stroke of the heads is changed, the bracket 163 is made slidable on its stationary supporting bracket and is secured to the end of a rod 251 by nuts 252, the lower end being pivoted to the arm of an eccentric 253 on the adjusting cross-shaft 133. This eccentric is so designed that the movement of the adjusting cross-shaft will move the bracket 163 an amount corresponding with

the change in the stroke of the capping heads. Consequently, the pawls and the weighted rods will continue to operate at the proper relative time.

In order that the bottles will properly feed, the distance between the feeding member 60 and the guide bar 45 is adjusted to correspond with the change in bottles. This is done by moving the guide bar transversely to make the feeding lane narrower. This guide bar 45 is supported at one end by a bracket arm 254 mounted on a vertical pin 255 moving in a suitable slot in the table and carried by a lever 256 pivoted on a stud 257 mounted on a bracket 258 on the stationary frame of the machine. This lever 256 is pinned to a knuckle 259 in turn pinned to a yoke 260 on a connecting rod 261 which has a knuckle connection with a bell-crank lever 263 fulcrumed on a stud 264 and having a double yoke 265 which straddles both the vertical rod 251 and a pin 266 thereon which connected the two. By means of this construction, movement of the vertical rod 251, as before described, swings the lever 256 which in turn moves the pin 255 to displace the end of the guide bar. To have the undriven end follow the positively moved end, so that the guide bar will always move parallel to itself, the undriven end is supported by a bracket 267 pivoted to a link 268, which is mounted on a stud 269 rigidly secured to the table, this link being parallel to the line between the pin 255 and the pivotal point of the moving lever, namely, the stud 257. To compensate for any variation in the machining of the parts, the yoke 260 is made adjustable on its shaft, so that the mechanism described may be adjusted to function properly.

It has been stated that the guide bar 108 cooperates in positioning the bottles under the capping heads, and this guide bar is therefore adjusted as to its position, in accordance with the size of the bottle used. To this end the guide bar 108 is supported by a bracket 270 pivoted to the end of one arm of a bell-crank lever 271 fulcrumed on a stud 272 secured to the table, the other arm of the bell-crank lever being pivoted to a link 273 mounted on the pin 255. Thus, the movement of the pin 255, which moves the guide bar 45, as above described, also and similarly moves the guide bar 108. In order that the latter may move parallel to itself, the undriven end is supported by a bracket 274 pivoted to a link 275 mounted on a stud rigidly secured to the table, this link being parallel to the arm of the bell-crank lever to which the guide bar bracket is pivoted. Fig. 5 shows this new position of the parts.

The orbit of the bottle transferring arms 112 and 126 is adjusted, in the present embodiment, by shifting the mean position of the longitudinal stroke of the bracket bar 113, and this is accomplished by changing the position of the fulcrum of the lever 118 which causes this longitudinal stroke. To this end the lever 256 which is fulcrumed on a stud carried by the bracket 258, as before described, is a double-armed lever and the arm extending beyond the stud is connected to the end of the lever 118 by a pivotal pin 276 which serves as the fulcrum of said lever during the operation of the machine. When lever 256 is swung on its pivot in the adjusting operation, the pin by which lever 118 is mounted on the connecting rod 120, acts as a pivot and swings the lever 118 to displace the position of the bracket bar 113 which carries the bottle-engaging arms. Due to this change in the fulcrum point, when the machine is again started, the bracket bar 113 carrying the bottle-engaging arms, moves in an orbit which has been shifted longitudinally, so that the arms will move in a position to properly function with the smaller bottles. It will be noted that the two guide bars 45 and 108 are moved by pin 255; that this pin and the fulcrum point of lever 118 are moved by lever 256; that this lever 256 and pawl-carrying bracket 163 are moved through the movement of the vertical rod 251; and that this rod is displaced by the same rotation of the adjusting shaft 133 that adjusts the position of the capping heads, so that all the above mentioned adjustments are accomplished by the single movement of the handle which operates this adjusting shaft.

The centering guide members 57, as before stated, are made in a plurality of sections and are held in place by simple dowel pins, so that their removal is a simple matter. Various sets of these guide members, differing in size, are provided, and the necessary substitution is readily made when different bottles are to be used.

To recapitulate more or less briefly the general operation of the machine, power being applied to the pulley 43, and the clutch thrown in by means of handle 230, shaft 42 is rotated. Through gears 55 and 54 this shaft drives the filling table shaft 50; through gears 41 and 40, vertical shaft 39, gears 38 and 37, it drives the cross-shaft 36; and through its pinion gear 138, crank 137, rocker-arms 136 and 131, yoke 130 and connection 139, it causes reciprocation of plunger 127 carrying the capping heads. The cross-shaft 36, in turn, through sprocket 35, chain 34, sprocket 33 and shaft 32 drives the feeding conveyor chains 29; through gears 124 and 123, it drives the short vertical shaft 122 which causes the movement of the bottle transferring apparatus; and through gears 205 and 206, sleeve 207 and shaft 200, it ro-

tates the hopper shaft for the crown feed. Bottles are placed in a mass on the feeding table 25 and are pushed along the table until taken by the conveyor chains 29. The bottles are positioned on the conveyor by means of the guide wall 44 and the guide bar 45, and they are conveyed toward the filling table, indiscriminately spaced, until the lead bottle is stopped by the end 59 of the feeding member 60. This feeding member is periodically withdrawn by the contact of the preceding bottle to permit single bottles to pass on to the filling table at intervals in synchronism with the progress of the centering guides 58. As each bottle moves onto the filling table, it is directed into a centering guide by the feeding member 60 and in turn displaces the latter to withdraw the stop end for the next bottle. As the revolving filling table carries the bottles beyond this receiving point, the rollers 76 of the lifting members 75 ride down off the raised portion of the cam track 77, thus permitting the push rod springs 78 to cause the filling heads to descend by depressing the push rods 73. The heads descend as a unit until the sealing gasket engages the top of the bottle, whereupon the valve cage 89 stops. The descent of the valve tube, air tube and valve continues until the bottom of the valve tube strikes the stop shoulder 64, which terminates the down stroke of the head. Meanwhile, the two rings of the sealing gasket have been forced together, thus flattening out the ribs 101 and effecting a seal between head and bottle. During this latter movement of the valve, it has moved away from its seat to open position and the liquid in the reservoir 83 flows down through the valve tube and the passages 98, and is delivered to the bottle in a thin film, as before described, the displaced air passing out via ports 99 and tube 92. Meanwhile, the filling table has been rotating, and as a given bottle approaches the discharge point, the roller 76 of the corresponding lifting member rides up the cam track 77, thereby causing the filling head to be raised by the elevation of the push rod. This upstroke of the head first raises the valve tube, air tube and valve until the valve is again seated against the bottom edge of the valve cage. This closes the valve and at the same time relieves the pressure on the gasket rings, so that they return to normal condition, thus opening the air passage 104 and venting the bottle. Further upward movement of the valve carries with it the valve cage, so that the head is raised as a unit to the top of the upstroke. It is kept in this position by the cam track while the filled bottles are being discharged and the empty bottles are being received, until it reaches such point that the above-described operation is repeated. As the filled bottles come in contact with the deflecting portion 109 of the guide bar 108, they are thereby transferred from the filling table into the space 110 of the stationary table 25, and from here they are transferred to capping position by the arms 112. These arms are moved in an approximately elliptical orbit by the mechanism before described in detail, this orbit being completed once for every two bottles that are discharged from the filling table. The two arms engage the two discharged bottles, respectively, and thus move them, in spaced relation, toward the capping heads, their contact with the guide bar 108 aiding in properly centering them. While the arms are returning for the next two bottles, the reciprocation of the plunger 127 lowers the capping heads, crowns having been fed to the throat guides as before described. As the heads descend, the bottles take the weight of the presser-feet and their plungers, thus releasing the locking mechanism, as already described. The latter part of the down stroke of the capping heads brings the rods 220 against the stop bracket 163. This releases lever 217 and permits the free end to swing up under the weight of the parts which causes stop fingers 210 to be swung up into the chute and engage the leading crowns, as shown in Fig. 9, thereby to prevent them from interfering with the crowns on the bottles in the throat space. The descent of the head causes the crowns to be crimped onto the bottles by the pressure of the crowning throats 146 in the usual manner, whereupon the heads make their upstroke. As the heads rise, the spring-weighted presser-feet 151 are free to rest on the capped bottles and hold them down until the bottles have been cleared by the heads. On the latter part of this upstroke, the locking members 159 come in contact with the shouldered pawls 164 and are thereby swung down to displace the bell-crank levers 156. This in turn raises the plunger 152 which withdraws the presser-feet out of the throat guide space. This latter part of the upstroke of the capping head also brings the lever 217 in contact with the weight 221 which depresses the free end of the lever and thus causes withdrawal of the crown stop fingers, thereby permitting the next crowns to enter the throat guides. The capped bottles are moved away from capping position by the stroke of the transferring arms that brings up the next two uncapped bottles.

While the above mentioned operations, in following the course of a bottle through the machine, are described as more or less successive, they are, of course, being carried on simultaneously as regards the machine as a whole after the first bottle has passed through. It is noted that the entire action, save for the delivery and removal of bottles

to and from the stationary table 25, is automatic, and that the various parts of the machine are so related and synchronized that bottles are fed, filled, transferred and capped in a rapid and continuous manner.

The term "bottle" has been applied throughout to the containers in question, but it is to be understood that the word is used in a comprehensive sense and includes all containers capable of use with the machines which embody the invention.

What is claimed is:

1. In packaging apparatus, and in combination, a plurality of packaging heads, a bottle-supporting table associated therewith to which bottles are delivered, a plurality of spaced bottle-engaging arms, a bar on which said arms are mounted, a plurality of pivoted guides in which said bar is slidable, a crank on which one of said guides is mounted, means for operating said crank, and means for simultaneously causing an endwise movement of the bar in said guides.

2. In packaging apparatus, and in combination, a plurality of packaging heads, a bottle-supporting table associated therewith to which bottles are delivered, a plurality of spaced bottle-engaging arms, a bar on which said arms are mounted, a plurality of pivoted guides in which said bar is slidable, a crank on which one of said guides is mounted, a link pivotally connected with said bar, and means for simultaneously reciprocating said link and operating said crank.

3. In a packaging machine, and in combination, a capping head reciprocated with respect to the bottle to be capped, a presser-foot for exerting a downward pressure on the capped bottles as the head leaves the same, a plunger for carrying said presser-foot, a pivoted bell-crank lever having a portion for engaging a portion of said plunger, said presser-foot and plunger being free to maintain such pressure on the bottle until the head and its associated parts have cleared the bottle, and a member actuated by the ascent of the head thereafter for swinging said bell-crank lever to raise said plunger and lock the same in raised position, said plunger being released by the contact of the presser-foot with a bottle on the downstroke of the head.

4. In a packaging machine, and in combination, a plurality of spaced bottle engaging arms moving in a substantially elliptical orbit to position bottles, and means for shifting the center of said orbit.

5. In a packaging machine, and in combination, a plurality of spaced bottle-engaging arms, means including a lever for moving said arms in an orbit, and means for shifting the fulcrum of said lever.

6. In packaging apparatus, and in combination, a packaging head, mechanism for reciprocating said head, an operating handle, and means operated by said handle and operating on said mechanism, for varying the stroke of the packaging head.

7. In packaging apparatus, and in combination, a packaging head, mechanism, including a rocker arm mounted on an eccentric, for reciprocating said head, an operating handle, and a connection between said handle and said eccentric whereby the latter is rotated upon operation of the handle to vary the stroke of the packaging head.

8. In packaging apparatus, and in combination, a packaging head, means for reciprocating said head, a presser foot movable relatively with respect to the head for exerting pressure on a capped bottle, means dependent on the relative position of the head for raising said presser foot, and means for simultaneously adjusting the stroke of the packaging head and the operation of said raising means.

9. In packaging apparatus, and in combination, a relatively stationary support, a packaging head, means for reciprocating said head, a presser foot movable relatively with respect to the head for exerting pressure on a capped bottle, means including an actuator carried by said support and a part carried by the head for raising said presser foot, an operating handle, and connections whereby operation of the handle causes a variation in the stroke of the packaging head and an adjustment of the position of said actuator.

10. In packaging apparatus, and in combination, a relatively stationary support, a packaging head, means for reciprocating said head, a crown feeding chute, a crown stop movable into and out of the path of the crowns in said chute, means dependent on the relative position of the head for operating said stop, and means for simultaneously varying the stroke of the head and the operation of said stop-operating means.

11. In packaging apparatus, and in combination, a packaging head, means for reciprocating said head, a bottle-feed guide bar, a bottle-deflecting guide bar, a plurality of bottle-transferring arms, an adjusting member, and means for simultaneously varying the position of said guide bars and the stroke of said head and arms upon operation of said adjusting member.

12. In packaging apparatus, and in combination, a relatively stationary support, a reciprocating packaging head, a presser foot movable with respect to the head for exerting a downward pressure on a capped bottle as the head rises therefrom, a lever for raising said presser foot, a latch member for operating said lever and holding it in a position with the presser foot raised, the latch being released when the presser foot is raised relatively to the head by a bottle,

and means carried by said support for operating said latch.

13. In packaging apparatus, and in combination, a relatively stationary support, a packaging head, means for reciprocating the head, a crown-feeding chute, a stop movable into and out of the path of the crowns in the chute, means including a lever for operating said stop, and a weight carried by the support for actuating said lever.

In testimony whereof, I have hereunto set my hand.

WILLIAM B. ENGLER.

Witnesses:
H. M. SAITHE,
FRANK L. LLOYD.