S. W. WILKINSON.

BOTTLE CAPPING MACHINE.

APPLICATION FILED JAN. 11, 1915.

1,171,996.

Patented Feb. 15, 1916.

7 SHEETS—SHEET 1.

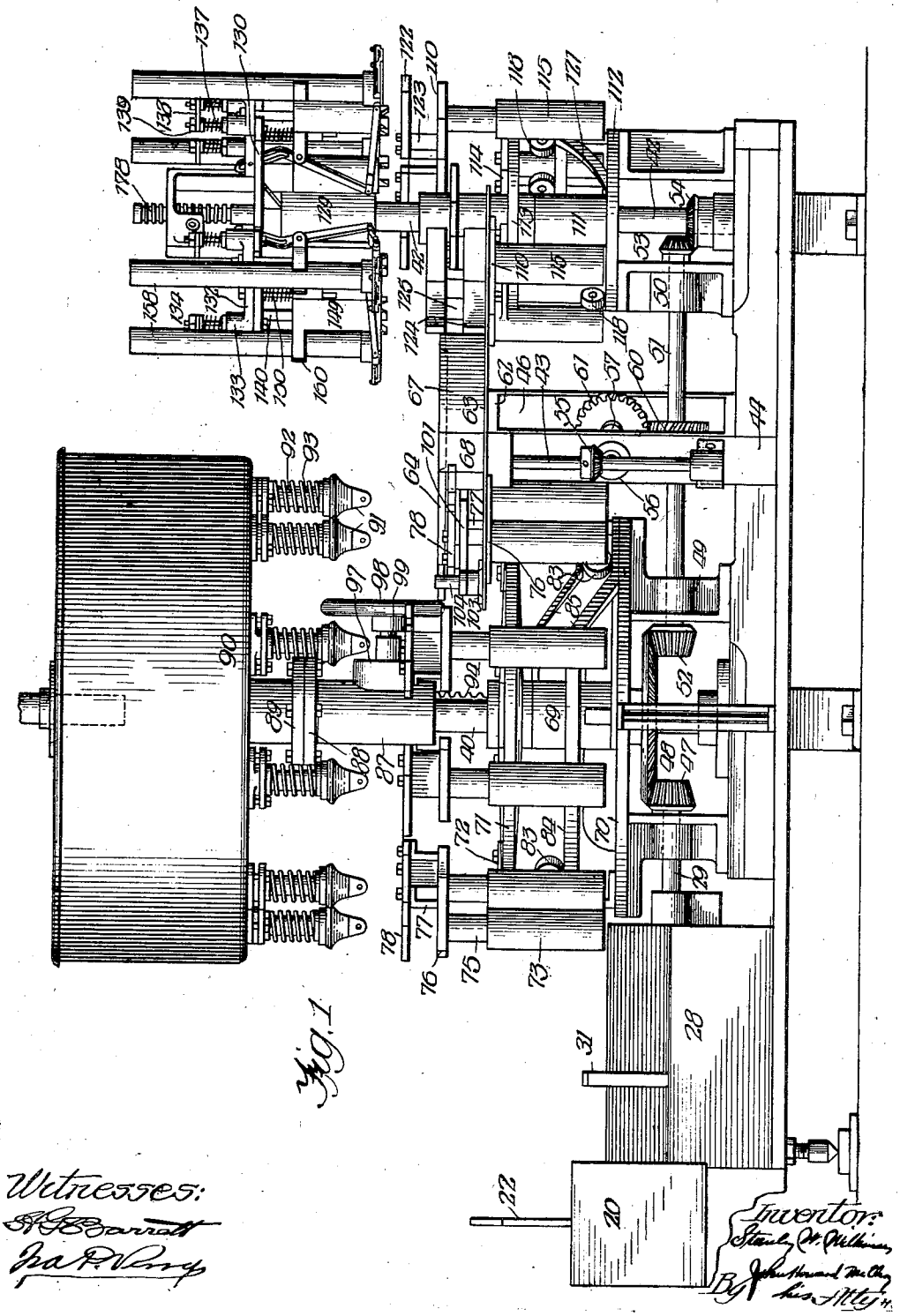


Fig. 1

Witnesses:

Inventor:

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3 SHEETS—SHEET 2.

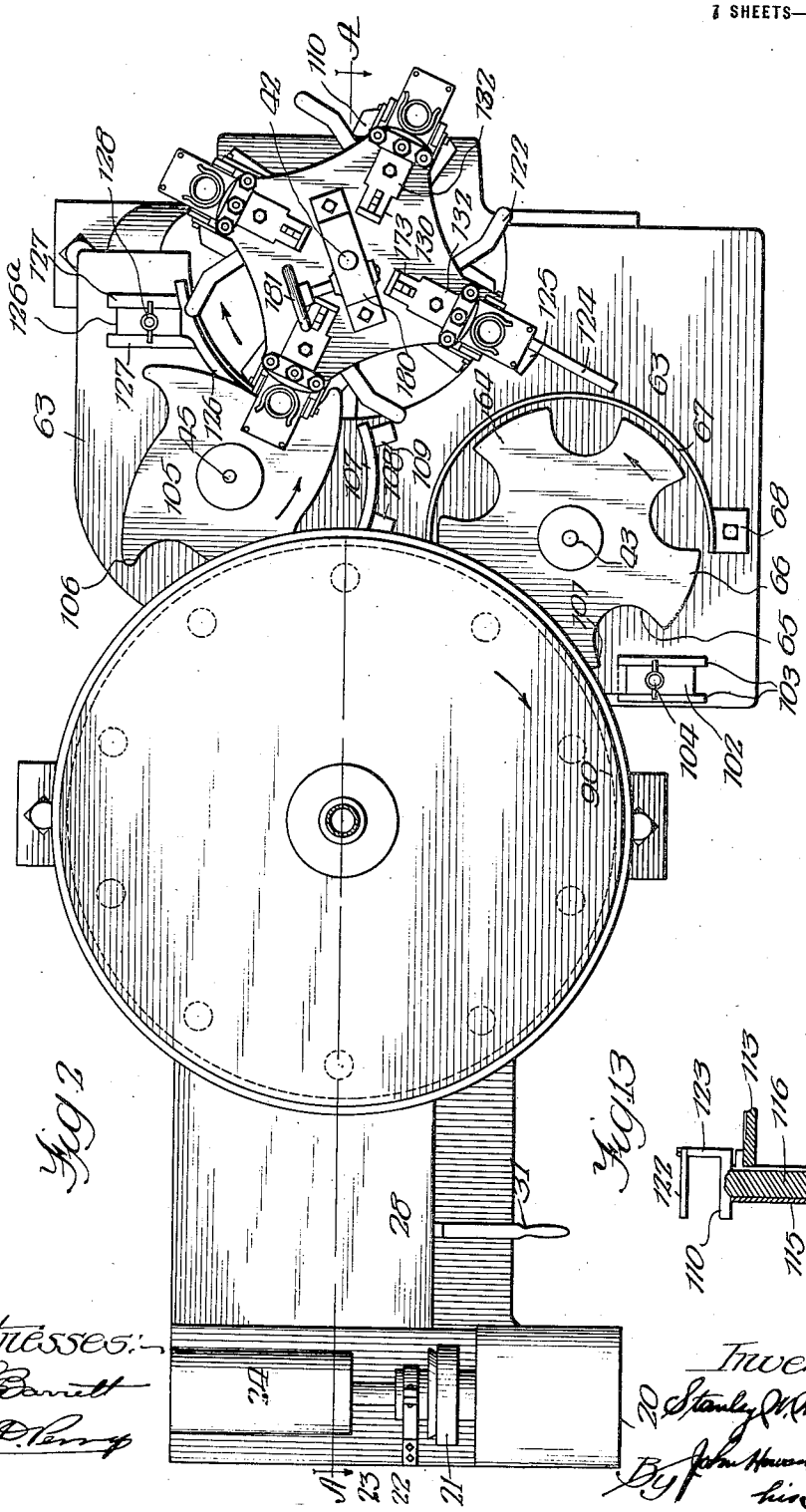


Fig. 2

Fig. 13

Witnesses:

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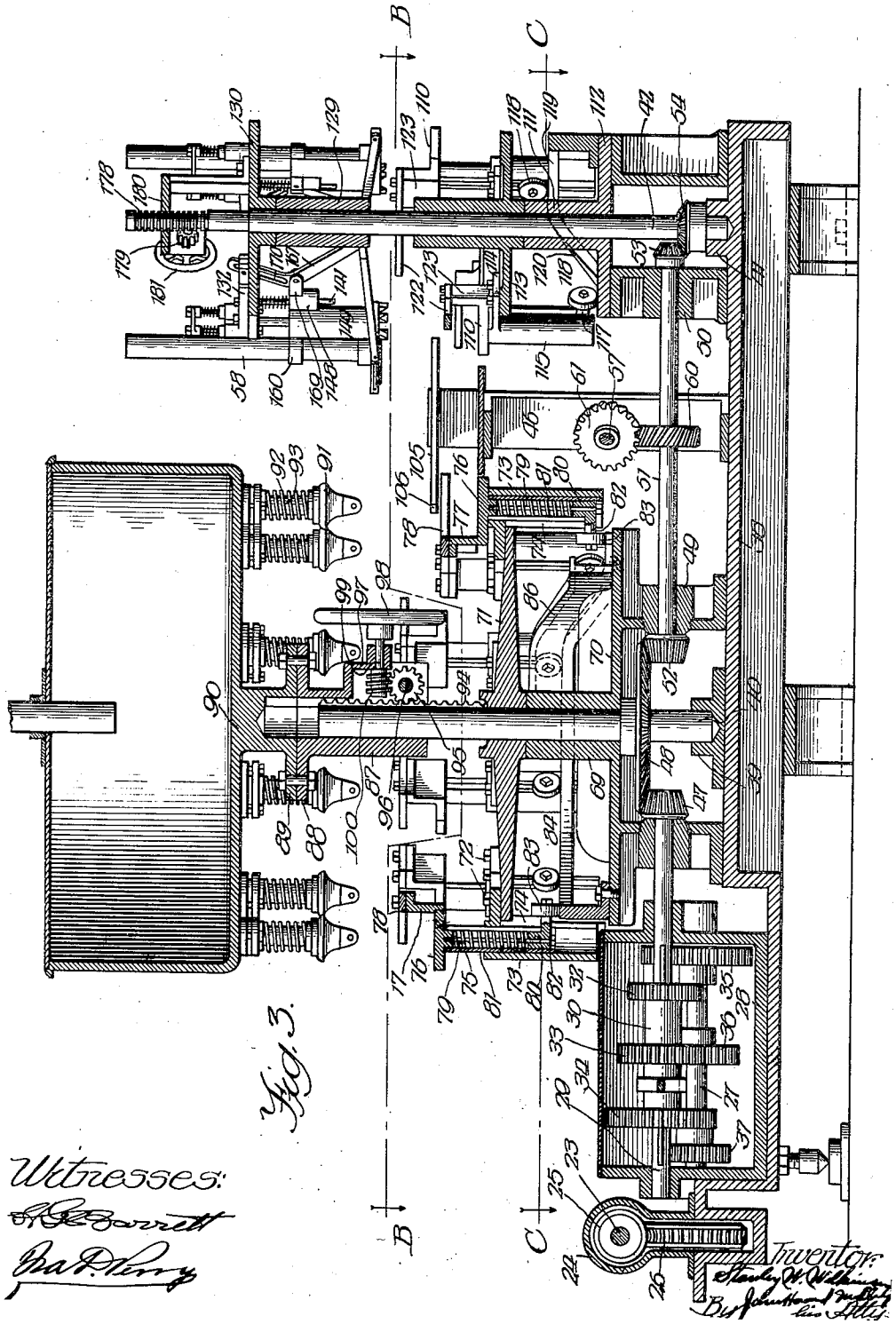


Fig. 3.

Witnesses:

Inventor:

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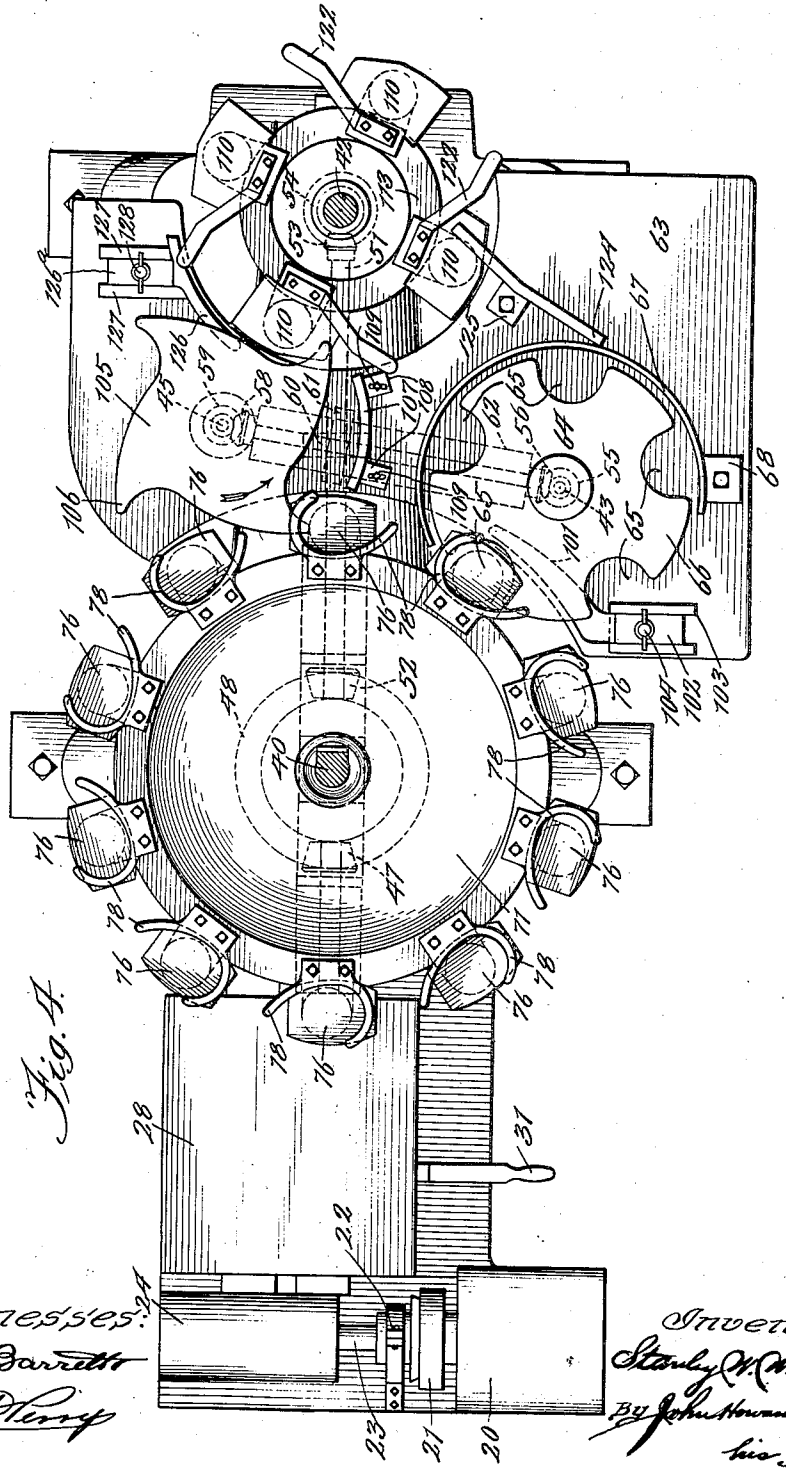


Fig. 4.

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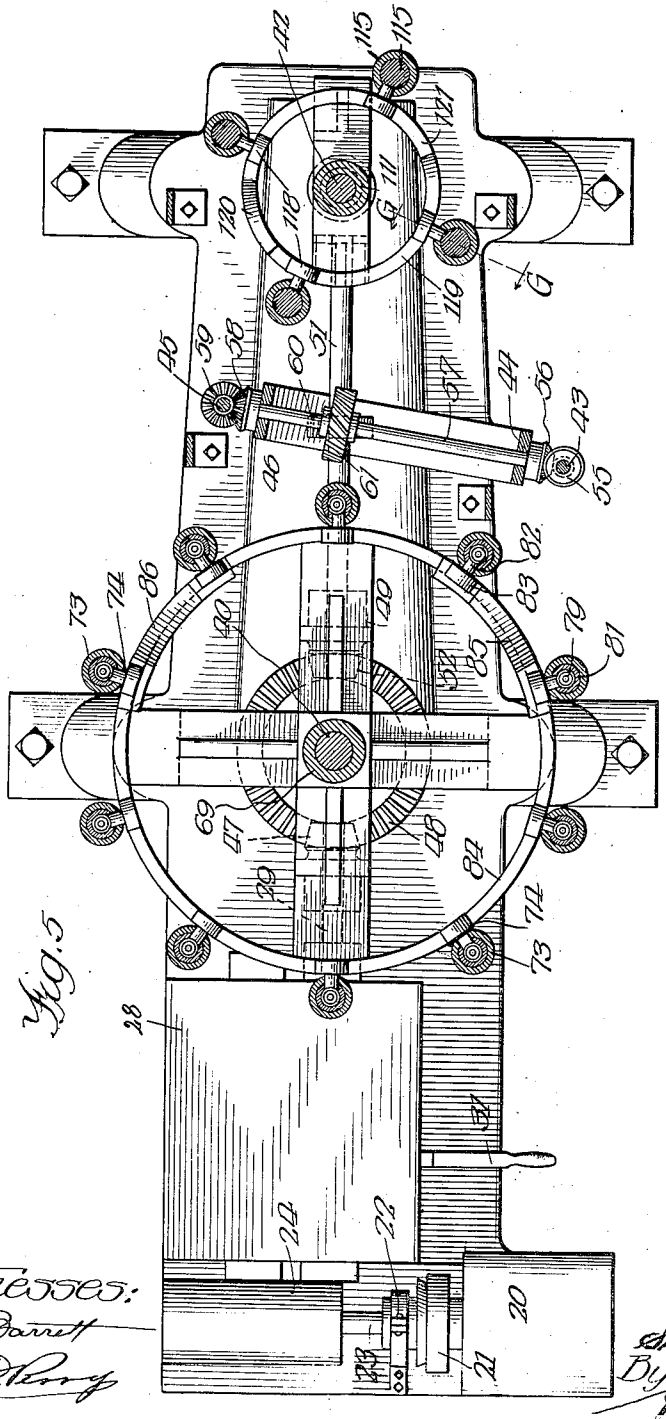


Fig. 5

Witnesses:

Inventor:

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7 SHEETS—SHEET 6.

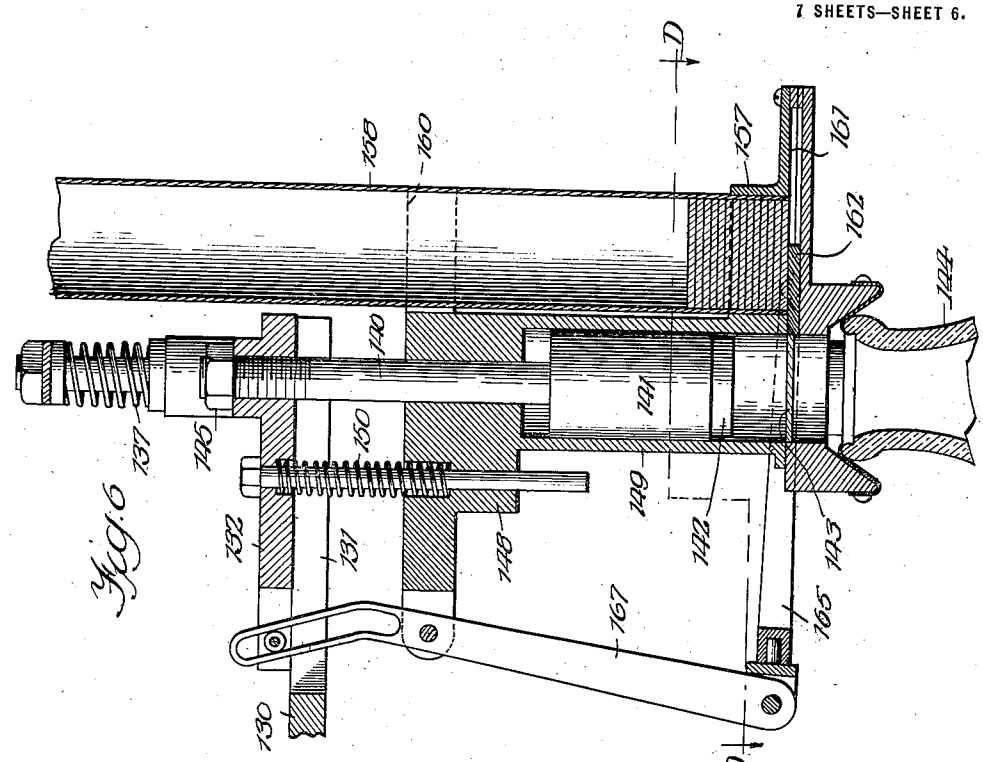


Fig. 6

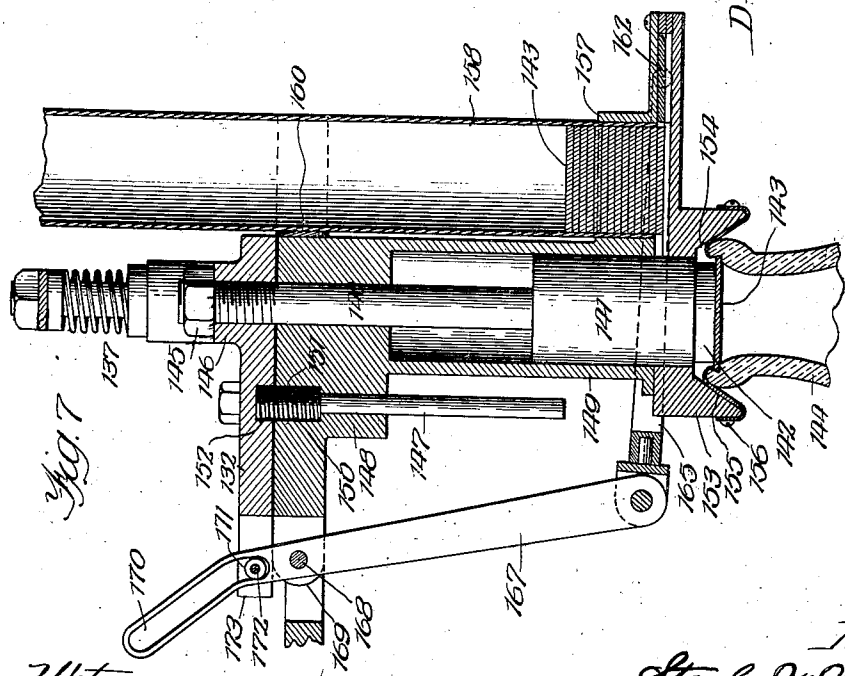


Fig. 7

Witnesses:

Inventor:

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BOTTLE CAPPING MACHINE.

APPLICATION FILED JAN. 11, 1915.

1,171,996.

Patented Feb. 15, 1916.

7 SHEETS—SHEET 7.

Fig. 8

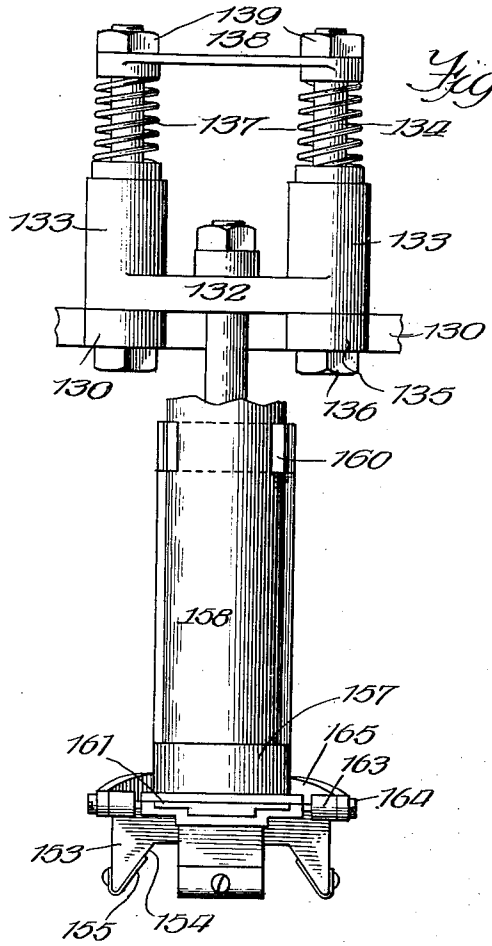


Fig. 11

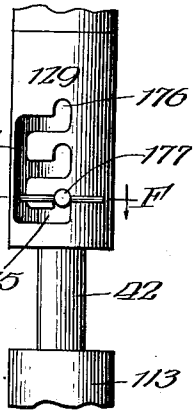


Fig. 12

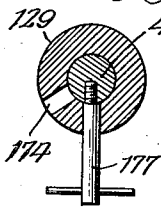


Fig. 10

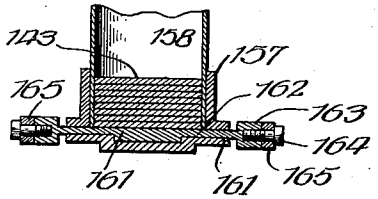
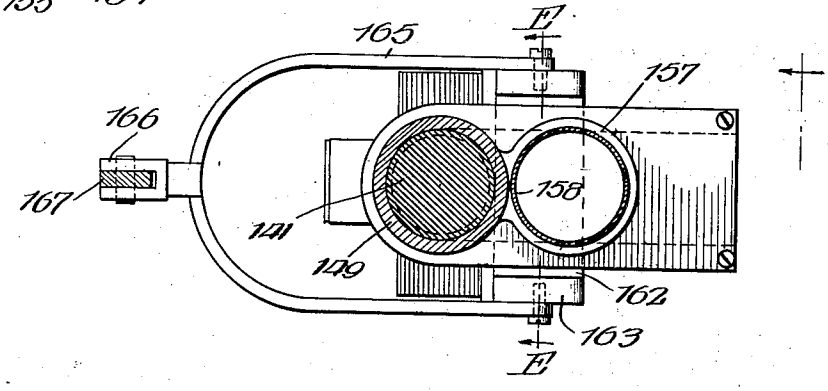


Fig. 9



Witnesses:

Inventor:

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By John Howard McElroy,

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UNITED STATES PATENT OFFICE.

STANLEY W. WILKINSON, OF NORTH CHICAGO, ILLINOIS, ASSIGNOR TO DAVIS MILK MACHINERY COMPANY, OF NORTH CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

BOTTLE-CAPPING MACHINE.

1,171,996. Specification of Letters Patent. Patented Feb. 15, 1916.

Application filed January 11, 1915. Serial No. 1,499.

To all whom it may concern:

Be it known that I, STANLEY W. WILKINSON, a citizen of the United States, and a resident of North Chicago, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Bottle-Capping Machines, of which the following is a full, clear, and exact specification.

My invention is concerned with milk-bottling machinery such as is employed by dairy companies to bottle milk in half-pint, pint and quart bottles, for example, for delivery to retail customers, and more especially with the machinery by which the bottles are automatically capped.

My invention is further concerned with bottle capping machinery in which a plurality of capping mechanisms are rotated about a common axis so as to cap by a continuous movement a line of filled bottles that are fed thereto by a continuous movement, so as to prevent the spilling that occurs where an intermittently fed and operated machine is operated at a high enough speed to give it the desired capacity.

My invention is concerned with machinery of the class described which can be readily adjusted for use with the different sized bottles, such as the half-pint, pint and quart bottles above mentioned.

My invention is further concerned with certain novel combinations of elements in such machinery, as will be hereinafter specifically described and particularly pointed out in the claims.

To illustrate my invention, I annex hereto seven sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which,—

Figure 1 is a side elevation of the complete apparatus; Fig. 2 is a top plan view of the same; Fig. 3 is a central, vertical, longitudinal section substantially on the line A—A of Fig. 2; Fig. 4 is a plan view in horizontal section on the line B—B of Fig. 3; Fig. 5 is a similar view on the line C—C of Fig. 3; Fig. 6 is a central vertical section, on an enlarged scale, through one of the capping mechanisms, showing the parts in position ready to insert the cap; Fig. 7 is a similar view, showing the parts in the position they occupy just after the cap is inserted; Fig. 8 is a front elevation of the capping mechanisms, as seen from the right-hand side of Fig. 6; Fig. 9 is a plan view in horizontal section as seen on the line D—D of Fig. 6; Fig. 10 is a vertical section as seen on the line E—E of Fig. 9; Fig. 11 is a detail showing the adjusting mechanism of the bottle-capping machinery; Fig. 12 is a detail in section on the line F—F of Fig. 11; and Fig. 13 is a detail in vertical section on the line G—G of Fig. 5.

For driving the machinery involved in my present invention, some suitable motive power is required, and for this purpose I preferably employ an electric motor 20, which may be supported on the framework at one end of the machine, and which is preferably provided with a clutch 21 and a clutch-shifting lever 22, so that the armature shaft of the motor may be coupled and uncoupled as desired, to the horizontal worm-shaft 23 mounted in a suitable housing 24, and having secured thereon a worm 25 meshing with the worm-wheel 26 secured on the drive shaft 27 journaled in suitable bearings in the gear casing 28.

As these machines may be called upon in small plants to fill and cap not only quart bottles, but even pint and half-pint bottles, and as they may be used in connection with pasteurizing apparatus which it is desired to work up to the full capacity of the apparatus, it is desirable to provide means whereby the machinery may be run at certain different speeds relative to the normal speed of the motor, so that if the machine is set, for instance, for half-pint bottles, it will run four times as fast as for quart bottles. Or, if set for pint bottles, it will run twice as fast as for quart bottles, so that the machine will take care of a uniform amount of milk irrespective of the size of the bottles in which it is being placed. For this purpose, I journal in the gear casing 28 a countershaft 29 which is provided with suitable speed-changing mechanism, so that it can be driven at different rates of speed from the shaft 27. A convenient form of such mechanism is the customary sleeve 30 splined on the shaft 29 and movable longitudinally thereon by the shifting lever 31, and provided with three spur gears 32, 33 and 34, of different diameters, and adapted to mesh with the coöperating spur gears 35,

36 and 37, respectively, secured on the shaft 27, when the sleeve 30 is shifted to the proper position.

All the machinery employed in the apparatus embodying my invention is preferably mounted on a common base-plate 38, which is suitably supported from the floor, and is provided with one bearing 39 for the lower end of the vertical filler shaft 40, and also with a similar bearing 41 for the vertical capper shaft 42. In the most efficient operation of the apparatus, I find it desirable to employ a bottle-feeding mechanism which is operated by a vertical feeder shaft 43 journaled in suitable bearings secured on the vertical standard 44, and also to employ a bottle-transferring mechanism to carry automatically the bottles from the filler to the capper, and this transferring mechanism is operated by a vertical transfer-shaft 45 journaled in suitable bearings carried by the vertical standard 46. As a suitable means for driving all four of these operating shafts at the same time and at the proper relative rates of speed, I secure on the inner end of the shaft 29 a bevel pinion 47 which meshes with a bevel gear 48 secured on the filler shaft 40, and I journal in suitable bearings 49 and 50 a horizontal shaft 51 having the bevel pinion 52 on its inner end meshing with the bevel gear wheel 48, and the bevel pinion 53 on its outer end meshing with a bevel gear wheel 54 secured on the capper shaft 42. Midway of the feeder shaft 43, I secure the miter gear 55 meshing with a miter gear 56 secured on one end of the horizontal shaft 57 journaled in suitable bearings formed in the standards 44 and 46, and on the other end of the shaft 57, I secure the miter gear 58 meshing with the miter gear 59 secured midway of the transfer shaft 45. The horizontal shaft 51 has secured thereon near the center thereof the screw gear 60 which meshes with a screw gear 61 secured on the horizontal shaft 57; and with the gearing thus described it will be obvious that all four of the vertical operating shafts are driven from the same source of power, and it will be understood that the gearing is properly proportioned to drive all four mechanisms at the proper relative speeds so that the bottles are delivered one by one by the feeder to the filler, from which they are delivered at the same rate by the transferring mechanism to the capper.

Secured primarily upon the cross piece 62 of the framework connecting the standards 44 and 46 is the sheet-metal table 63, which serves to support the bottles when they are placed in the feeder, and also to support them as they are carried from the filler to the capper, and finally to support them after they are delivered from the capper and until they are removed by the attendant. The feeder shaft 43 has secured on its upper end the feeder disk 64, which has a suitable number of recesses 65 formed in the edges thereof, forming arms 66, and in these recesses 65 the empty, clean bottles are placed one by one by the attendant, and as the shaft rotates, the bottles are carried anti-clockwise from the corner of the table around through an angle of, say, 270°, at which point they are delivered to the filler. They are held in place during this movement by the semicircular guide piece 67 supported at one end by the block 68, to which the guide piece is secured, and which in turn is secured to the table 63.

The filler shaft 40, in addition to being journaled in the step bearing 39, is also journaled in the bearing 69 formed in the top of the casting 70 forming a part of the framework, and just above this bearing 69 is rigidly secured on the shaft the disk or spider 71, which has secured on the periphery thereof, at equal intervals, the brackets 72, which have projecting downward from their outer edges the tubes 73, which have a slot 74 on the side facing the filler shaft 40. Mounted to reciprocate in this tube 73 is the tubular spindle 75, which carries on its upper end the bottle-supporting plate 76, which is provided on its inner side with upwardly projecting arms 77, to which is secured the guiding and retaining hook 78. The hollow spindle 75 has extending down through the center thereof the headed rod 79, over which the plug 80 is adapted to slide within the spindle 75. A helically-coiled expanding spring 81 is interposed between the upper end of the cavity in the spindle 75 and the top of the plug 80. A bearing stud 82 projects inwardly through the slot 74, and has journaled on its outer end the roller 83, which coöperates with a cam track 84 secured on the top of the casting 70. This cam track 84 has, on the side adjacent the feeder disk, an incline 85, up which the rollers 83 ride immediately after the bottle has been delivered on the support 76 with which the roller is associated, and it will be obvious that this upward movement carries the bottle upward a certain distance. At the other side of the machine is a similar downwardly-directed incline 86, provided with an overhanging flange, so that as the roller 83 passes this incline, the support, with the bottle thereon, is lowered. By reference to Fig. 4, it will be perfectly apparent that the bottles placed in the recesses 65 of the anti-clockwise rotating disk 64 will be carried to a point tangent to the disk 71, at which point the hooks 78 will engage the bottle and carry it on to the support 76 with which it is associated.

Splined on the upper end of the filler shaft 40 is the sleeve 87, which terminates in the head 88, on which is bolted the flange

89 formed on the bottom of the tub or receptacle 90 into which the milk flowing from the pasteurizer or other source of supply is delivered. Mounted in the bottom of this tub are a number of radially disposed, automatic valves 91, which are forced down into their closed position by the helically-coiled contractile springs 92 surrounding the discharge tubes 93. These valves may be of any customary construction, so that when the bottle is carried up by the action of the incline 85 on the cam track, the mouth of the bottle will be engaged by the bottom of the valve and closed, after which the continued upward movement of the bottle opens the valve and allows the bottle to fill with milk flowing through the valve, while the rotation of the receptacle and the attached valve continues. Before the incline 86 of the cam track is reached, the bottle is filled, and as the roller 83 travels down this incline, the bottle is moved down away from the valve, which automatically closes, as soon as it descends far enough, under the action of the spring 92.

I have heretofore mentioned the fact that the same machine is adapted to handle different sizes of bottles, such, for instance, as half pints, pints and quarts, and in order to adapt it for this purpose, I form on one side of the spline of the filler shaft 40 a series of rack teeth 94 which mesh with a small gear pinion 95 journaled on a suitable short shaft 96 mounted in bearings in the housing 97 secured to one side of the sleeve 87. A hand wheel 98 is secured on the worm shaft 99 journaled in a suitable bearing in the housing 97, and having the worm 100 on its inner end engaging with the gear 95. By turning the hand wheel 98, it will be obvious that the receptacle can be raised or lowered as may be necessary to position it for the different sizes of bottles, which have different heights.

In connection with the delivery of the bottles from the feeder disk 64 onto the support 76, I employ the guide piece 101, which extends beneath the disk 64 and has its working edge formed on the arc of a circle concentric with the filler shaft 40. The shank 102 of the guide piece 101 is mounted to slide in the ways 103 secured on the top of the feed table 63, and a set screw 104 is threaded through the shank and engages with the bottom of the table 63 or some other suitable abutment, to secure the guide piece 101 in the different positions of adjustment which are necessary to adapt the feeding device to different sized bottles, which are of different diameters.

Secured upon the upper end of the transfer shaft 45 is the transfer disk or plate 105, which has a plurality of arms or fingers 106 suitably shaped and timed to engage the bottles on the supports 76 after the bottles have descended after being filled, and to pull the bottles thus engaged off of the supports 76 onto the adjacent surface of the table 63. As soon as these arms 106 have carried the bottles off of the supports 76, they are brought into engagement with the inner edge of the guide piece 107, which has its bearing edge formed on the arc of a circle concentric with the transfer shaft 45, and which is provided with one or more shanks 108, which may be slotted and provided with set screws 109 threaded through the slots and into the top of the table 63, or some other suitable abutment, to clamp the guide piece 107 in any desired position of adjustment, as may be necessary to guide the different sizes of bottles, having different diameters, across the table 63 and onto the bottle suports 110 of the capper.

The capper shaft 42, in addition to being journaled in a suitable bearing 41, also has a bearing in the elongated sleeve 111 formed in the casting 112 forming a part of the framework. Secured on the capper shaft 42 immediately above the sleeve 111 is the disk or spider 113, which has bolted or otherwise secured on its edges the brackets 114 corresponding to the brackets 72, and like them terminating in slotted sleeves 115, similar to the sleeves 73. Mounted to slide in the sleeve 115 is the plunger 116 secured on the under side of the bottle-supporting plate 110, and this plunger has projecting from the bottom thereof the bearing stud 117, on which is journaled the roller 118, which coöperates with the circular cam track 119 secured concentrically with the capper shaft 42 upon the top of the casting 112. This cam track has the upwardly directed incline 120, up which the roller 118 rides immediately after the bottle has been safely delivered on the support 110, and on the opposite side of the capper shaft 42 is the downwardly extending incline 121, down which the roller 118 rides after the cap has been inserted, to allow the plunger to descend under its own weight and the weight of the filled and capped bottle, to bring the top of the bottle support 110 substantially on a level with the top of the table 63, upon which it is forced by the camming action of the discharge arm 122 secured on the top of the flange 123 projecting upward from the inner side of the bottle support 110. The filled and capped bottle engages the discharge piece 124 extending from the shank 125 secured on the top of the table, and when it is thus engaged and its further movement with the rotating capper stopped, the discharge arm 122 will cam the bottle outwardly and off of the support 110, and onto the table 63, whence it is taken by the attendant and placed in a suitable crate, or otherwise disposed of.

In connection with the delivery of the bottles from the table 63 onto the supports 110 by the transfer disk 105, I provide the transfer guide-piece 126, which is curved on the arc of a circle concentric with the capper shaft 42, and which has the shank 126ª movable in the guide pieces 127 secured on the top of the table 63, and it is provided with the set screw 128 threaded through the shank and engaging the bottom of the table 63 or other abutment to clamp the guiding piece 126 in the proper position to coöperate with the edges of the bottles delivered to the capper until they are clamped in position between the supports 110 and the capping mechanism proper to be described.

Splined upon the capper shaft 42 is the sleeve 129, which terminates in the disk or spider 130, and formed in the edge of this spider 130 is a series of radially-extending slots 131, corresponding in number to and located directly above the bottle supports 110. Placed above each of these slots 131 is a plate 132, which has projecting upward from the outer corners thereof the sleeves 133, through which extend the rods or bolts 134, which extend through ears 135 formed on the peripheries of the disk 130, with the heads 136 beneath said ears. Helically-coiled expanding springs 137 surround the rods 134 above the tops of the sleeves 135 and below the cross-head 138 which connects the tops of the two bolts and is held in the proper position to give the desired tension to the springs 137 by the nuts 139 threaded on the upper ends of the bolts. With this construction, it will be obvious that the plates 132 are held down under heavy spring tension against the top of the disk 130. Threaded into the plate 132, between the sleeves 133, is a plunger rod 140 terminating in the plunger 141 having the reduced end 142, which is adapted to cooperate with the cap 143 and force the same into its seat in the neck of the milk bottle 144, as shown in Figs. 6 and 7. The vertical position of this plunger 141 is controlled by the threading of the rod 140 into the plate 132, and when it has been properly adjusted, it is locked in the desired position by the nut 145, which is screwed down onto the boss 146 formed on the top of the plate 132, and through which the rod 140 is threaded. A guide pin 147 is secured in the plate 132 in radial alinement with the plunger 140, and extends down through the block 148 forming the top of the guiding tube 149, which, as will be hereinafter explained, reciprocates over the plunger 141. A helically-coiled expanding spring 150, much weaker than the springs 137, surrounds this guide rod 147 and is seated in a recess 151 formed in the top of the block 148, and in an opposed recess 152 formed in the bottom of the plate 132. The tube or cylinder 149 has secured on the lower end thereof the bottle clamp 153, which has four arms, as best seen in Fig. 8, which have inclined inner edges 154 suitably shaped to engage the top of the bottle 144 and center it in alinement with the plunger 141. To cushion the top of the bottle in this clamp 153, I may provide therein the leaf springs 155, shaped as shown in Figs. 6 and 7, and secured in place by screws 156. The bottom of the tube 149 is provided with the circular extension 157, which is of the proper size to receive the customary pasteboard tube 158, which is adapted to be filled with caps 143, which are delivered to the trade in this manner, and the block 148 is provided with spring jaws 160, which also coöperate with this tube 158. Beneath the bottom of the tube 158 are formed guide slots 161 for the pusher plate 162, which has thickened edges 163, into which are threaded the screws 164, which form the bearings for the ends of the yoke 165 pivoted thereon, and provided at its inner end with the fork 166 in which is pivoted the actuating lever 167. This lever is fulcrumed on the pin 168 mounted in ears 169 projecting from the top of the block 148, which block is adapted to enter the recess 131 in the disk 130. The lever 167 is provided in its outer end with a cam slot 170, in which is placed the anti-friction roller 171 journaled on the bearing rod 172 extending between the ears 173 formed on the plate 132.

The action of this capping mechanism is as follows: The position of the parts when the bottles 144 are in their lowermost position is shown in Fig. 6, and it will be noted that the pusher plate 162 has pushed a cap 143 into the bottom of the tube 149 beneath the end 142 of the plunger 141. As the bottle 144 is carried up by the ascent of the support 110, the top enters the clamp 153 and is centered thereby, after which the continued upward movement of the bottle carries with it the block 148 and the cylinder 149 against the resistance of the spring 150. As the bottle rises, the roller 171 acts on the cam slot 170 and forces the yoke 165 and the pusher plate 162 back across the bottom of the tube 158, and eventually to the position shown in Fig. 7, where it is entirely past the bottom of the tube 158, so that the stack of caps therein is free to fall, and the lowermost rests in position to be engaged by the pusher when the movement is reversed. The plunger 141 being stationary during this movement, the bottle eventually rises to a position where the cap is inserted in the opening and forced home by the end 142 of the plunger. In case a bottle slightly taller than the ordinary one is encountered, the plate 132, which normally remains stationary, can be raised sufficiently against the tension of the springs 137 to accommodate

the taller bottle and prevent any possible breakage.

As previously mentioned, the capper must be adapted for use with different sized bottles, the same as the filler, and for this purpose the sleeve 129 is provided with the elongated vertical slot 174, which has three horizontal branches 175 terminating in vertical recesses 176, and a pin 177 adapted to pass through these slots is screwed into the capper shaft 42, as seen in Fig. 12. The upper end of the shaft 42 is reduced, as shown in Fig. 3, and provided with annular rack teeth 178, which coöperate with the spur gear pinion 179 secured to the end of a short shaft journaled in the overhanging bracket 180, and having the hand wheel 181 secured on its outer end. This construction enables me, by rotating the hand wheel 181, to raise and lower the disk 130, and consequently the entire capping mechanism, to adapt it for different sized bottles, and it will be understood that the pin 177 coöperating with the notches 176 serves to lock the capper in the different positions of adjustment, it being understood that when the screw 177 is in the uppermost notch 176, it is adjusted for half pints, and so on.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States is:

1. In a bottle capping machine, the combination with a rotary standard, of a plurality of capping mechanisms carried thereby, each comprising a holder for a plurality of stacked, flat, pasteboard caps, a cap feeding member moving across the holder to move the caps one by one to a position above the top of the milk bottle, and a member operating to force the fed cap into the throat of the bottle by a relative movement of the member and bottle, means for automatically feeding bottles to and from said mechanisms, and means for automatically operating said mechanisms as the standard is rotated to cap the bottles passing therethrough.

2. In a bottle capping machine, the combination with a rotary standard, of a plurality of capping mechanisms carried thereby, each comprising a hollow clamping jaw, a plunger adapted to reciprocate therethrough, a supply tube for caps, feeding mechanism to feed the caps one by one into the clamping jaw, and a vertically movable standard on which the bottle rests as it passes through the machine, means for automatically feeding bottles to and from the standard, and gearing for operating the various parts as the bottles are fed therethrough to cap the same.

3. In a bottle capping machine, the combination with a rotating supporting frame; of a plurality of radially arranged bottle capping mechanisms, each consisting of a plunger carrying rod depending from the supporting frame, a plunger carried thereby, a vertically movable member surrounding the plunger and terminating at its lower end in a clamping jaw adapted to engage the top of a bottle, a vertically-movable bottle-support, a cap-tube carried by the vertically-movable member, a slide reciprocating across the bottom of the tube to deliver the caps one by one beneath the plunger, and automatic means actuated by the vertical movement of the member to reciprocate the slide; means for rotating the supporting frame; a stationary frame; and connections between the stationary frame and the vertically movable bottle supports to raise the latter at a certain place in their rotation with the supporting frame.

4. In a bottle capping machine, the combination with a rotating supporting frame; of a plurality of radially arranged bottle capping mechanisms, each consisting of a plunger carrying rod depending from the supporting frame, a plunger carried thereby, a vertically movable member surrounding the plunger and terminating at its lower end in a clamping jaw adapted to engage the top of a bottle, a vertically-movable bottle-support, a cap-tube carried by the vertically-movable member, a slide reciprocating across the bottom of the tube to deliver the caps one by one beneath the plunger, a yoke connected to the slide, a cam lever pivoted on the vertically-movable member, and an abutment supported by the supporting frame to coöperate with the cam lever to reciprocate the slide; means for rotating the supporting frame; a stationary frame; and connections between the stationary frame and the vertically movable bottle supports to raise the latter at a certain place in their rotation with the supporting frame.

5. In a bottle capping machine, the combination with a rotating supporting frame; of a plurality of radially arranged bottle capping mechanisms, each consisting of a plunger carrying rod depending from the supporting frame, a plunger carried thereby, a vertically movable member surrounding the plunger and terminating at its lower end in a clamping jaw adapted to engage the top of a bottle, a vertically-movable bottle-support, a cap-tube carried by the vertically-movable member, a slide reciprocating across the bottom of the tube to deliver the caps one by one beneath the plunger, a yoke connected to the slide, a cam lever piv-

oted on the vertically-movable member having a cam slot in its upper end, and a roller in the slot journaled on a bearing supported by the supporting frame; means for rotating the supporting frame; a stationary frame; and connections between the stationary frame and the vertically movable bottle supports to raise the latter at a certain place in their rotation with the supporting frame.

6. In a bottle capping machine, the combination with a rotary standard; of a plurality of capping mechanisms carried thereby, each comprising a hollow clamping jaw, a plunger adapted to reciprocate therein, a supply tube for caps, feeding mechanism to feed the caps one by one into the clamping jaw, and a support on which the bottle rests as it passes through the machine; means for automatically feeding bottles to and from the supports; and gearing for operating the various parts as the bottles are fed therethrough to cap the same by a relative vertical movement of the clamping jaws and supports.

7. In a bottle capping machine, the combination with a rotating rigid supporting frame; of a plurality of radially arranged bottle capping mechanisms, each consisting of an auxiliary frame carried by the supporting frame, springs for holding the auxiliary frame against the rigid frame under ordinary pressures, a plunger-carrying rod depending from the auxiliary frame, a plunger carried thereby, a vertically-movable member surrounding the plunger and terminating at its lower end in a claming jaw adapted to engage the top of a bottle, a vertically-movable bottle-support carried by the rigid supporting frame, a cap-tube carried by the vertically-movable member, a slide reciprocating across the bottom of the tube to deliver the caps one by one beneath the plunger, and automatic means actuated by the vertical movement of the member to reciprocate the slide; means for rotating the rigid supporting frame; a stationary underframe; and connections between the stationary underframe and the vertically movable bottle supports to raise the latter at a certain place in their rotation with the supporting frame.

8. In a bottle capping machine, the combination with a rotating rigid supporting frame; of a plurality of radially arranged bottle capping mechanisms, each consisting of an auxiliary frame carried by the supporting frame, springs for holding the auxiliary frame against the rigid frame under ordinary pressures, a plunger-carrying rod depending from the auxiliary frame, a plunger carried thereby, a vertically-movable member surrounding the plunger and terminating at its lower end in a clamping jaw adapted to engage the top of a bottle, a vertically-movable bottle-support carried by the rigid supporting frame, a cap-tube carried by the vertically-movable member, a slide reciprocating across the bottom of the tube to deliver the caps one by one beneath the plunger, automatic means actuated by the vertical movement of the member to reciprocate the slide, and a weaker spring interposed between the auxiliary frame and the vertically-movable member to force the latter down as the bottle descends; means for rotating the rigid supporting frame; a stationary underframe; and connections between the stationary underframe and the vertically movable bottle supports to raise the latter at a certain place in their rotation with the supporting frame.

9. In a bottle capping mechine, the combination with a rotating head, of a frame beneath said head rotating therewith, a plurality of vertically-movable bottle-supports mounted on said frame, means for raising said supports as they pass a certain point in their cycle of rotation, and a corresponding plurality of capping mechanisms carried by the head over the bottle supports and acting automatically to cap any bottle carried up into engagement therewith by the upward movement of its support, each of said capping mechanisms comprising a holder for a plurality of stacked, flat, pasteboard caps, a cap feeding member moving across the holder to move the caps one by one to a position above the top of the milk bottle, and a member operating to force the fed cap into the throat of the bottle by a relative movement of the member and bottle.

10. In a bottle capping machine, the combination with a rotating head, of a frame beneath said head rotating therewith, a plurality of vertically-movable bottle-supports mounted on said frame, means for raising said supports as they pass a certain point in their cycle of rotation, and a corresponding plurality of capping mechanisms carried by the head over the bottle supports and acting automatically to cap any bottle carried up into engagement therewith by the upward movement of its support and to deliver a fresh cap into capping position as the bottle descends, each of said capping mechanisms comprising a holder for a plurality of stacked, flat, pasteboard caps, a cap feeding member moving across the holder to move the caps one by one to a position above the top of the milk bottle, and a member operating to force the fed cap into the throat of the bottle by a relative movement of the member and bottle.

11. In a bottle capping machine, the combination with a rotating head, of a frame beneath said head rotating therewith, a plurality of vertically-movable bottle-supports mounted on said frame at equal radial

distances from the axis thereof, a circular cam-track with which the lower ends of the supports coöperate to raise them as they pass a certain point in their cycle of rotation, and a corresponding plurality of capping mechanisms carried by the head over the bottle supports and acting automatically to cap any bottle carried up into engagement therewith by the upward movement of the support, each of said capping mechanisms comprising a holder for a plurality of stacked, flat, pasteboard caps, a cap feeding member moving across the holder to move the caps one by one to a position above the top of the milk bottle, and a member operating to force the fed cap into the throat of the bottle by a relative movement of the member and bottle.

12. In a bottle capping machine, the combination with a rotating head, of a frame beneath said head rotating therewith, a plurality of vertically-movable bottle-supports mounted on said frame at equal radial distances from the axis thereof, rollers journaled on the bottoms of said frames, a circular cam-track with which the rollers cooperate to raise the supports as they pass a certain point in their cycle of rotation, and a corresponding plurality of capping mechanisms carried by the head over the bottle supports and acting automatically to cap any bottle carried up into engagement therewith by the upward movement of the support, each of said capping mechanisms comprising a holder for a plurality of stacked, flat, pasteboard caps, a cap feeding member moving across the holder to move the caps one by one to a position above the top of the milk bottle, and a member operating to force the fed cap into the throat of the bottle by a relative movement of the member and bottle.

13. In a bottle capping machine, the combination with a vertical shaft, of a head secured on the top thereof and adapted to rotate therewith, a frame beneath said head rotating therewith, a plurality of vertically-movable bottle-supports mounted on said frame, means for raising said supports as they pass a certain point in their cycle of rotation, a corresponding plurality of capping mechanisms carried by the head over the bottle supports and acting automatically to cap any bottle carried up into engagement therewith by the upward movement of the support, each of said capping mechanisms comprising a holder for a plurality of stacked, flat, pasteboard caps, a cap feeding member moving across the holder to move the caps one by one to a position above the top of the milk bottle, and a member operating to force the fed cap into the throat of the bottle by a relative movement of the member and bottle, and means for adjusting the position of the head on the shaft to adapt the machine for different sized bottles.

14. In a bottle capping machine, the combination with a vertical shaft, of a head secured on the top thereof and adapted to rotate therewith, a frame beneath said head rotating therewith, a plurality of vertically-movable bottle-supports mounted on said frame, means for raising said supports as they pass a certain point in their cycle of rotation, a corresponding plurality of capping mechanisms carried by the head over the bottle supports and acting automatically to cap any bottle carried up into engagement therewith by the upward movement of the support, and means for adjusting the position of the head on the shaft to adapt the machine for different sized bottles, said means consisting of rack teeth on the shaft, a pinion journaled in bearings carried by the head, and means for rotating the pinion.

15. In a bottle capping machine, the combination with a vertical shaft, of a head secured on the top thereof and adapted to rotate therewith, a frame beneath said head rotating therewith, a plurality of vertically-movable bottle-supports mounted on said frame, means for raising said supports as they pass a certain point in their cycle of rotation, a corresponding plurality of capping mechanisms carried by the head over the bottle supports and acting automatically to cap any bottle carried up into engagement therewith by the upward movement of the support, each of said capping mechanisms comprising a holder for a plurality of stacked, flat, pasteboard caps, a cap feeding member moving across the holder to move the caps one by one to a position above the top of the milk bottle, and a member operating to force the fed cap into the throat of the bottle by a relative movement of the member and bottle, means for adjusting the position of the head on the shaft to adapt the machine for different sized bottles, and means for holding the head in the chosen adjustment.

16. In a bottle capping machine, the combination with a vertical shaft, of a head secured on the top thereof and adapted to rotate therewith, a frame beneath said head rotating therewith, a plurality of vertically-movable bottle-supports mounted on said frame, means for raising said supports as they pass a certain point in their cycle of rotation, a corresponding plurality of capping mechanisms carried by the head over the bottle supports and acting automatically to cap any bottle carried up into engagement therewith by the upward movement of the support, means for adjusting the position of the head on the shaft to adapt the machine for different sized bottles, and means for holding the head in the chosen adjustment, consisting of a pin carried by the shaft, a sleeve attached to the head and having horizontal

slots connected by a common vertical slot through which the pin passes.

17. In a bottle capping machine, the combination with a rotary frame carrying a plurality of bottle supports, of a head rotating therewith carrying a corresponding plurality of capping mechanisms over the supports, each comprising a holder for a plurality of stacked, flat, pasteboard caps, a cap feeding member moving across the holder to move the caps one by one to a position above the top of the milk bottle, and a member operating to force the fed cap into the throat of the bottle by a relative movement of the member and bottle, and means for rotating the frame and head and causing successive relative movements of the suports and the capping mechanisms to cap the bottles during each rotation of the frame.

In witness whereof, I have hereunto set my hand and affixed my seal this 24th day of December, A. D. 1914.

STANLEY W. WILKINSON. [L. S.]

Witnesses:

JOHN HOWARD MCELROY,

MILDRED ELSNER.