E. NORDSTROM.

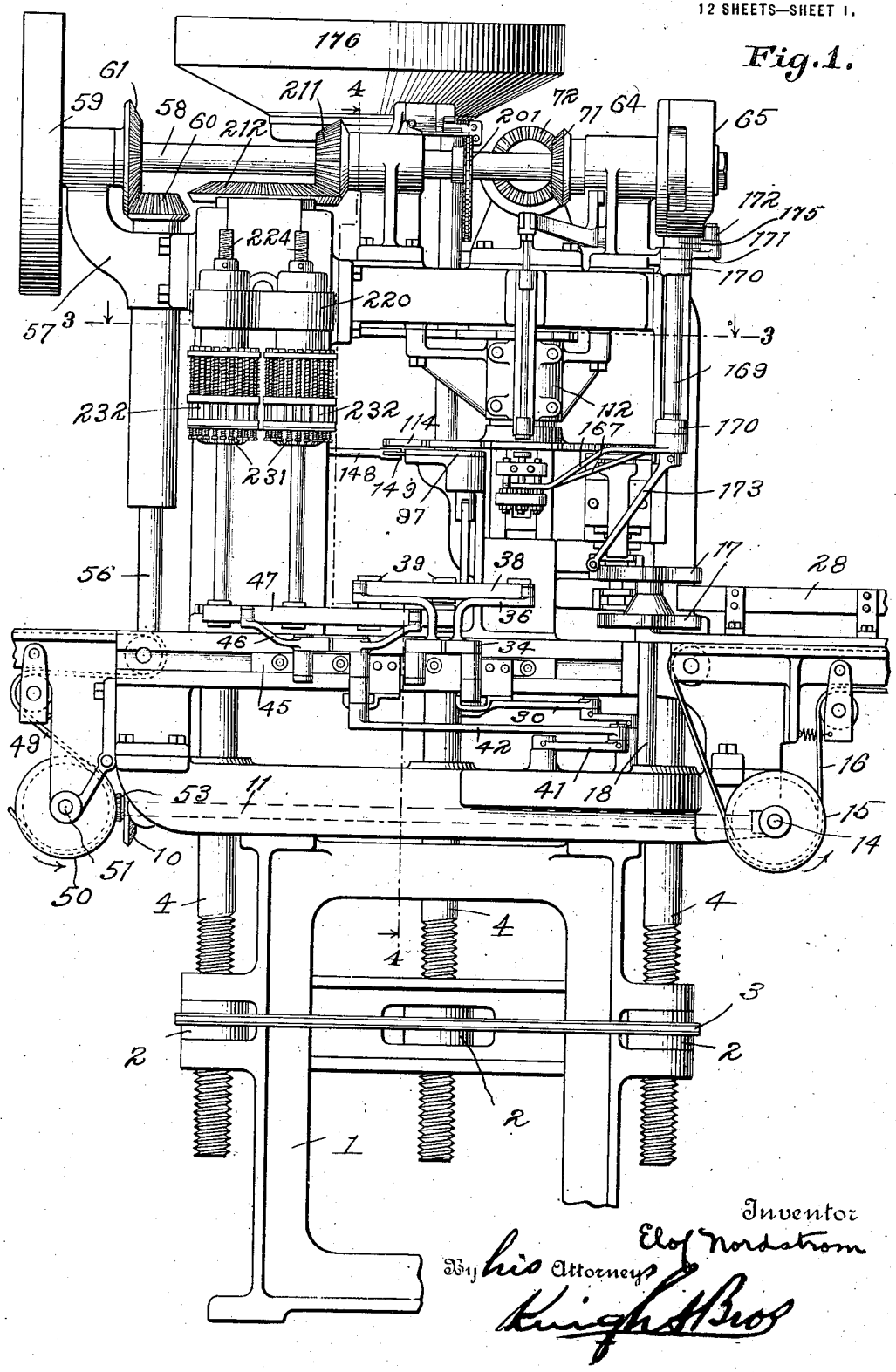
CAP MAKING AND BOTTLING MACHINE.

APPLICATION FILED AUG. 31, 1915.

1,212,665. Patented Jan. 16, 1917.

12 SHEETS—SHEET 1.

Fig. 1.



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Eloy Nordstrom

By his Attorneys

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E. NORDSTROM.

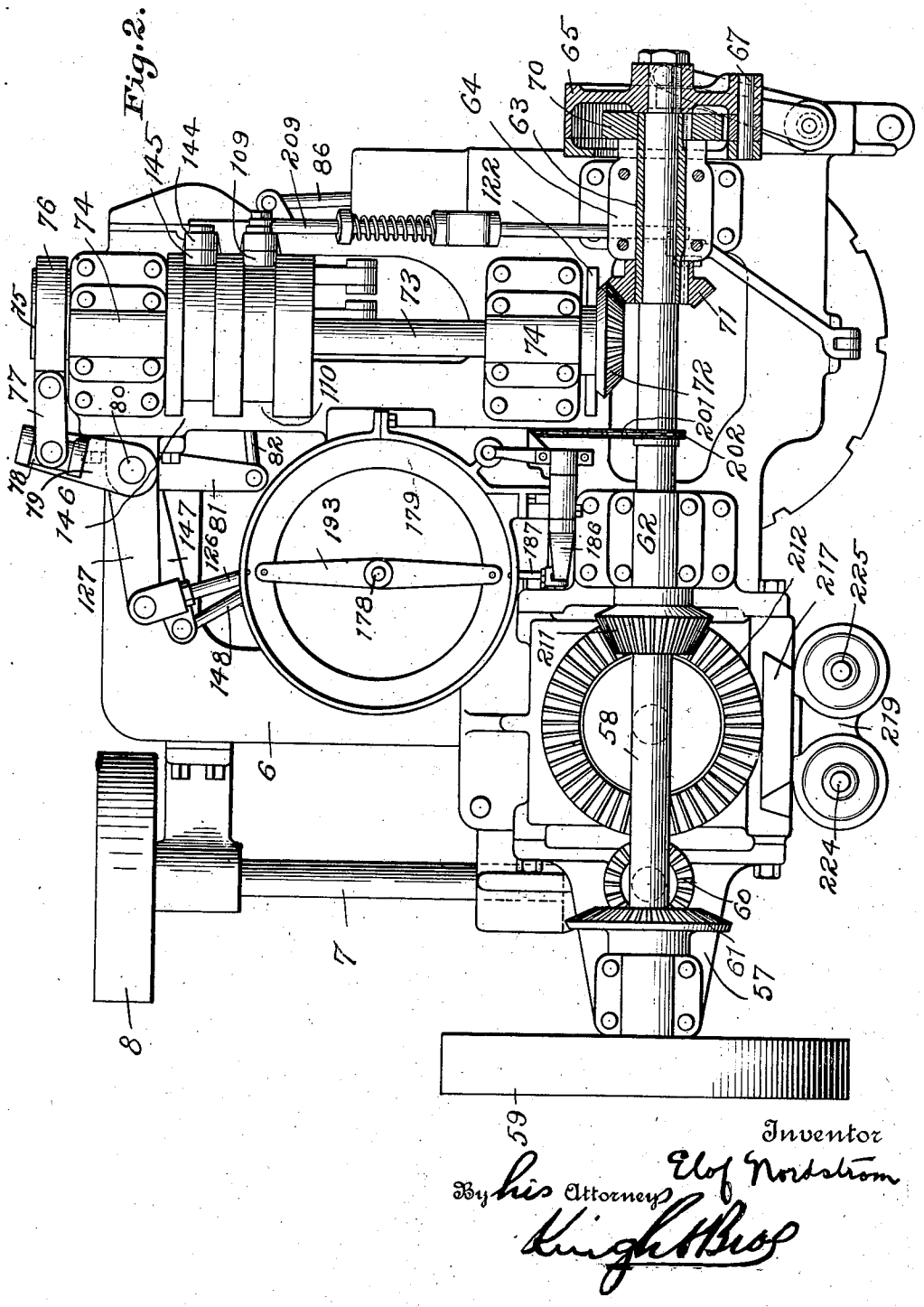
CAP MAKING AND BOTTLING MACHINE.

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1,212,665. Patented Jan. 16, 1917.

12 SHEETS—SHEET 2.

Fig. 2.



Inventor

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CAP MAKING AND BOTTLING MACHINE.

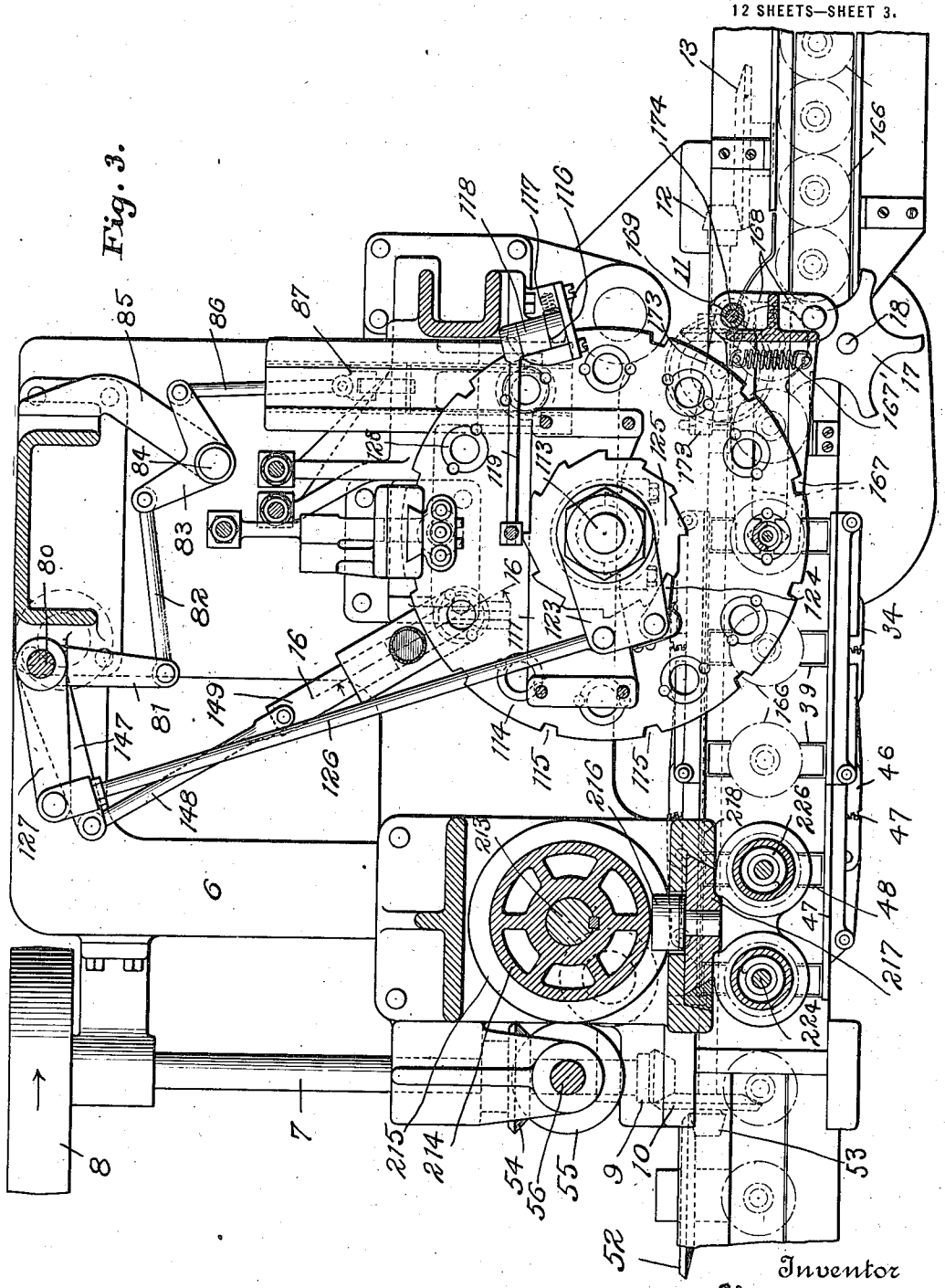
APPLICATION FILED AUG. 31, 1915.

1,212,665.

Patented Jan. 16, 1917.

12 SHEETS—SHEET 3.

Fig. 3.



Inventor

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By his Attorneys

Lingelbach

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CAP MAKING AND BOTTLING MACHINE.

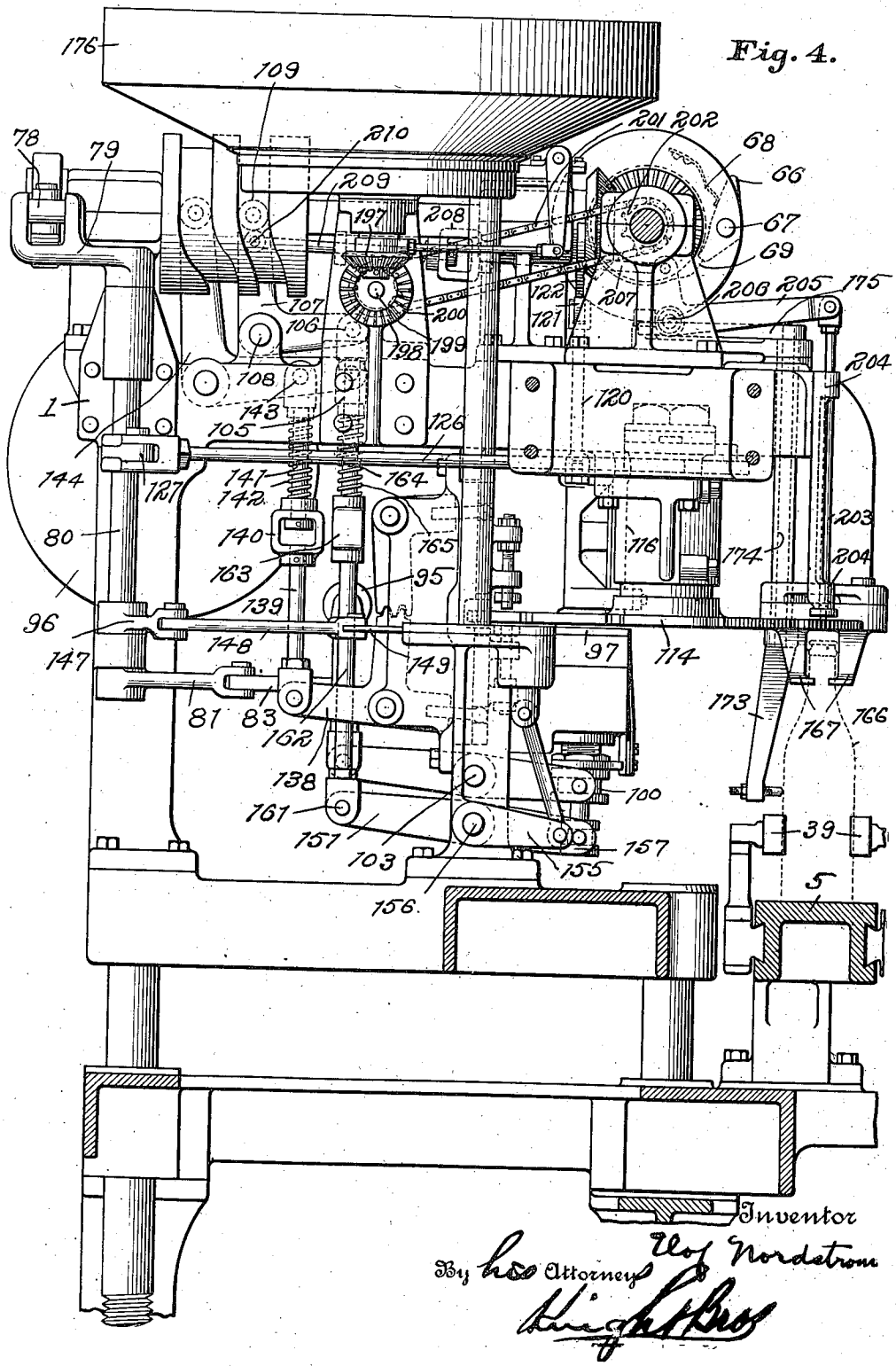
APPLICATION FILED AUG. 31, 1915.

1,212,665.

Patented Jan. 16, 1917.

12 SHEETS—SHEET 4.

Fig. 4.



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CAP MAKING AND BOTTLING MACHINE.

APPLICATION FILED AUG. 31, 1915.

1,212,665.

Patented Jan. 16, 1917.

12 SHEETS—SHEET 5.

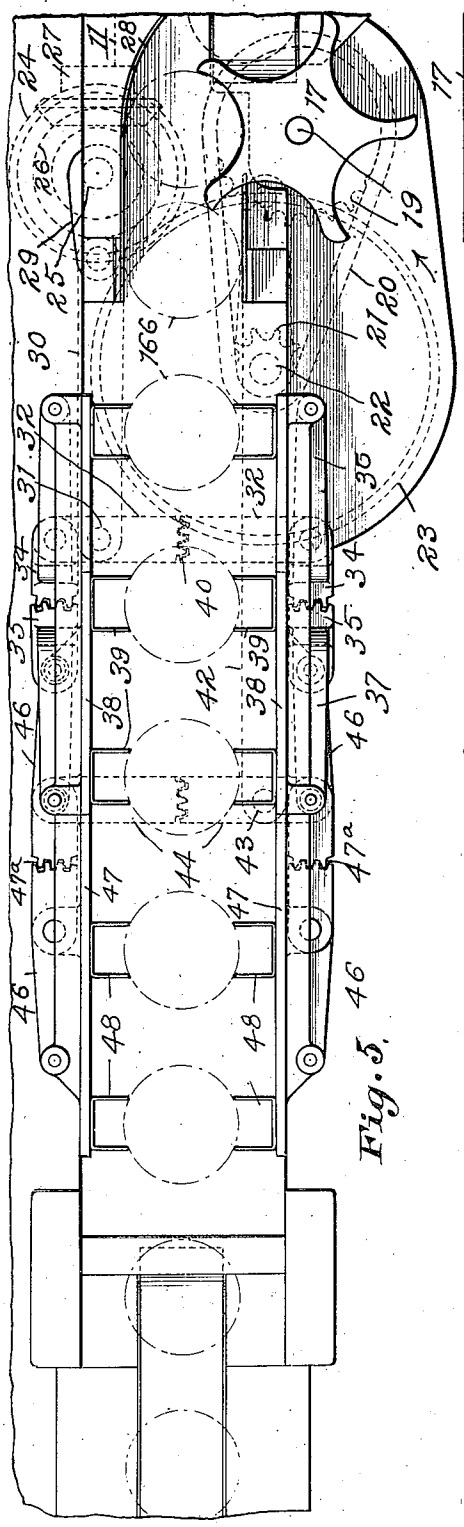


Fig. 5.

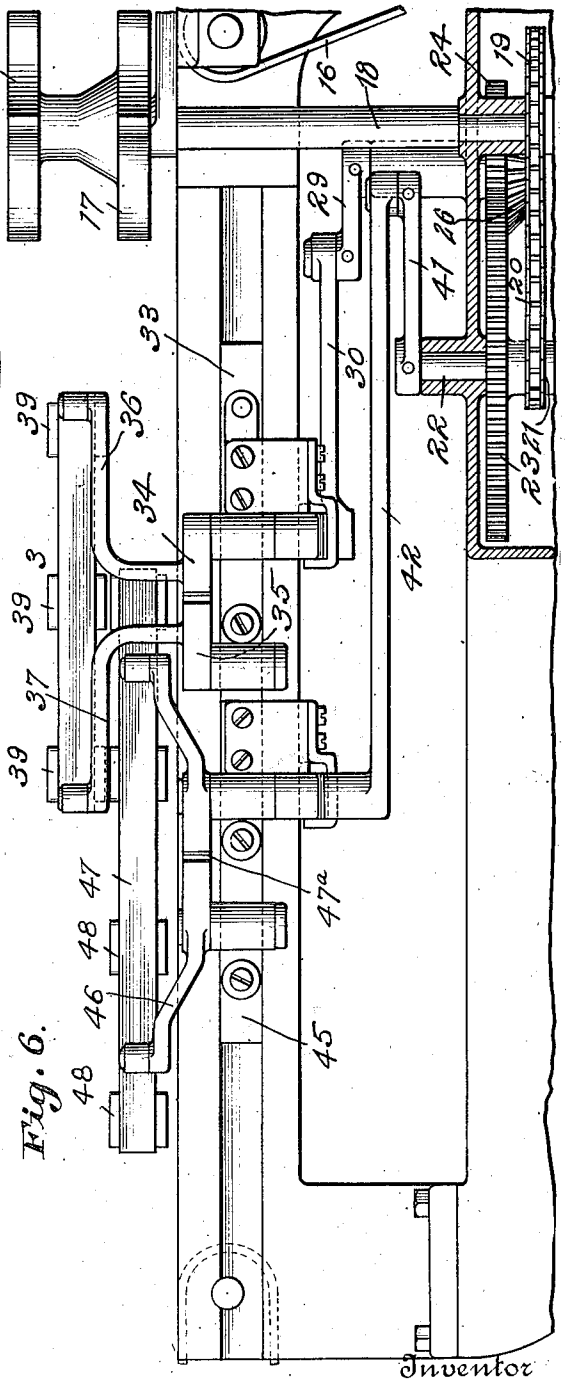


Fig. 6.

Inventor

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CAP MAKING AND BOTTLING MACHINE.

APPLICATION FILED AUG. 31, 1915.

1,212,665.

Patented Jan. 16, 1917.

12 SHEETS—SHEET 6.

Fig. 8.

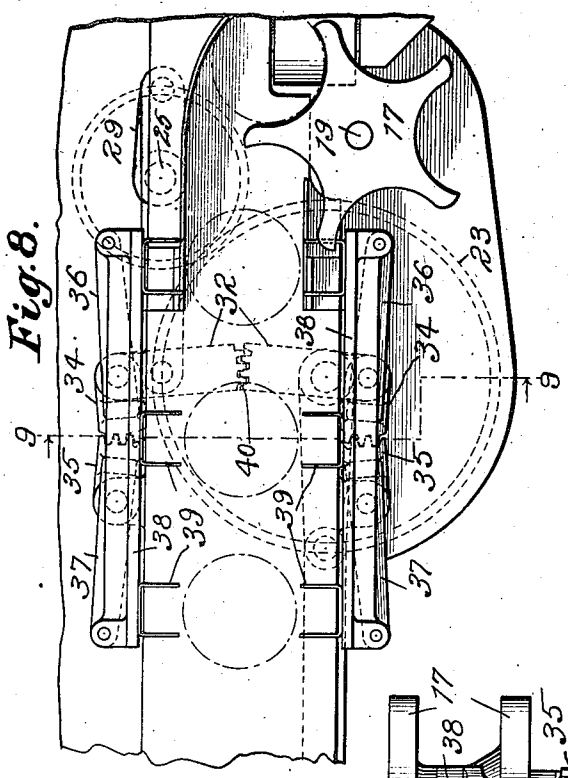


Fig. 9.

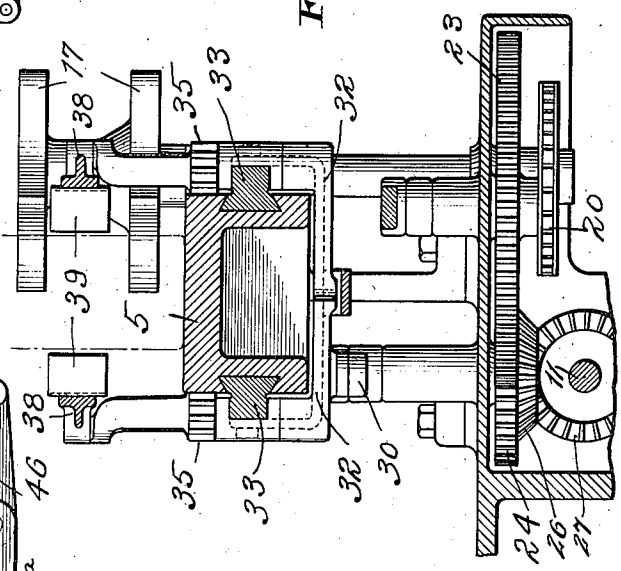
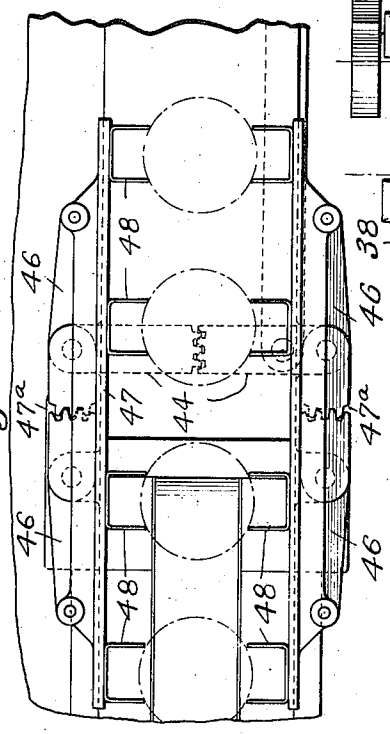


Fig. 7.



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CAP MAKING AND BOTTLING MACHINE.

APPLICATION FILED AUG. 31, 1915.

1,212,665. Patented Jan. 16, 1917.

12 SHEETS—SHEET 1.

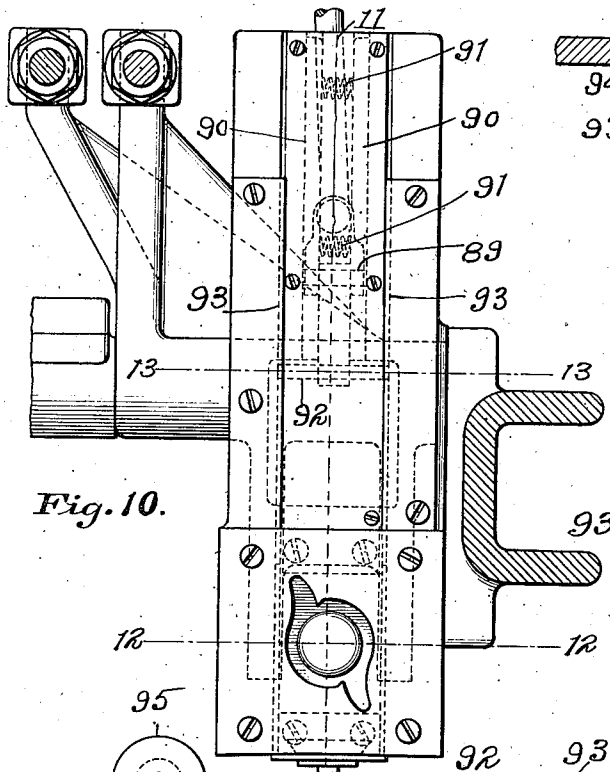


Fig. 10.

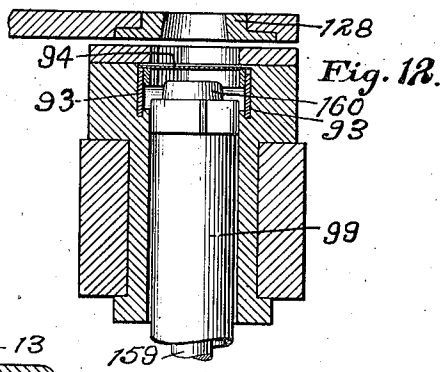


Fig. 12.

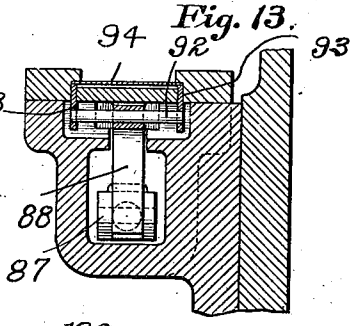


Fig. 13.

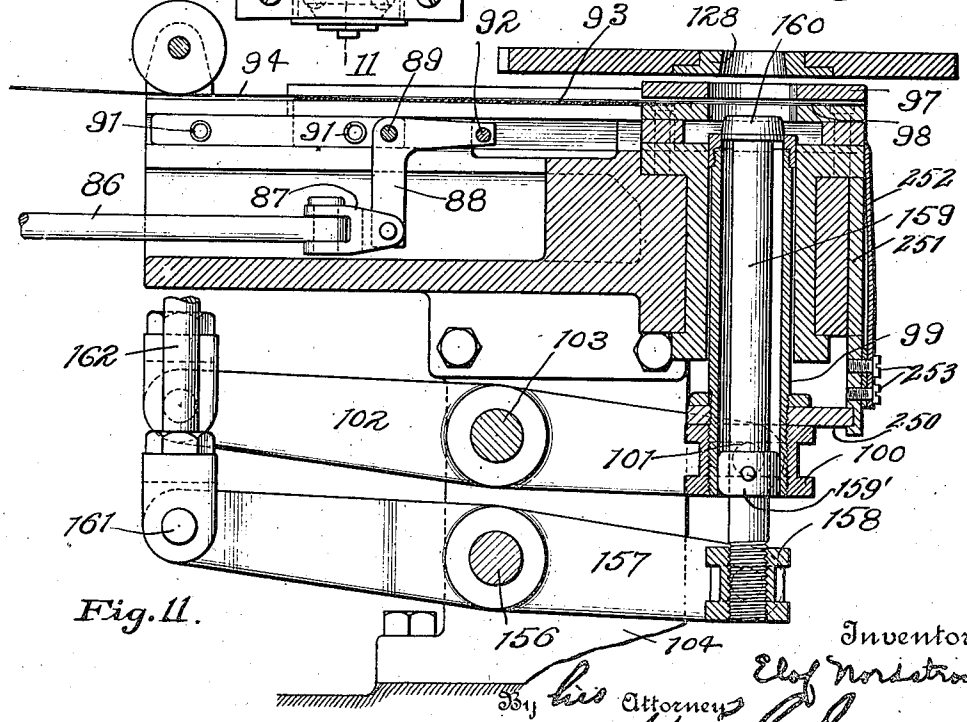


Fig. 11.

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CAP MAKING AND BOTTLING MACHINE.

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12 SHEETS—SHEET 8.

Fig. 16.

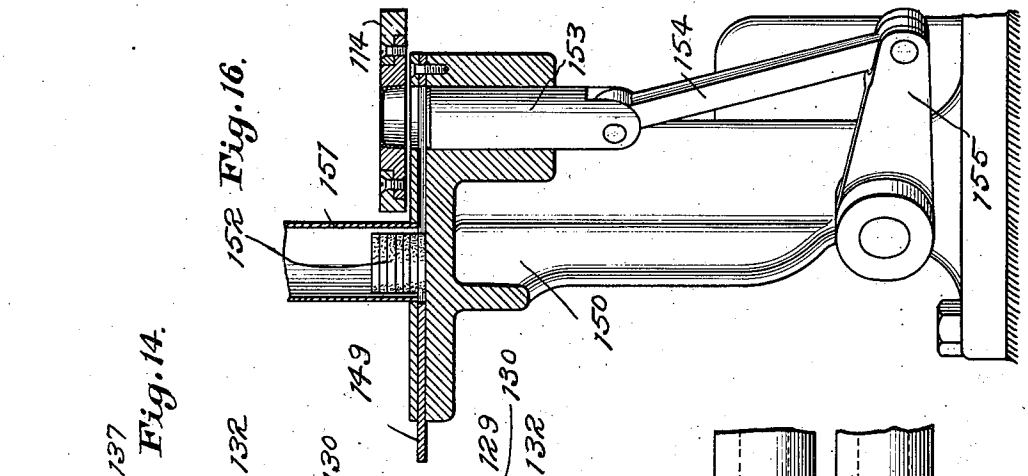
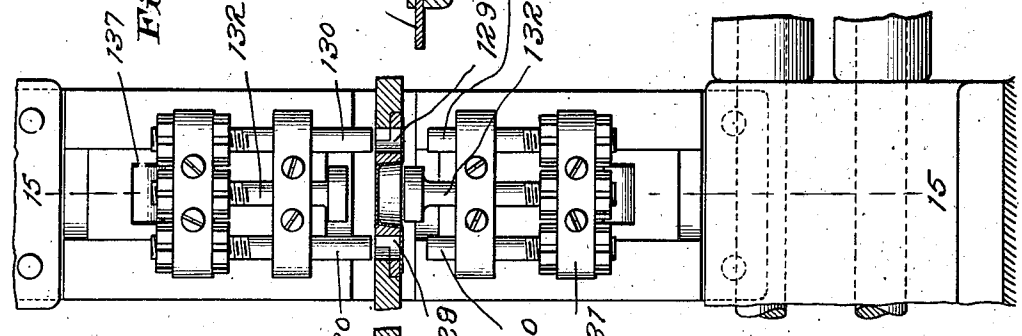


Fig. 14.



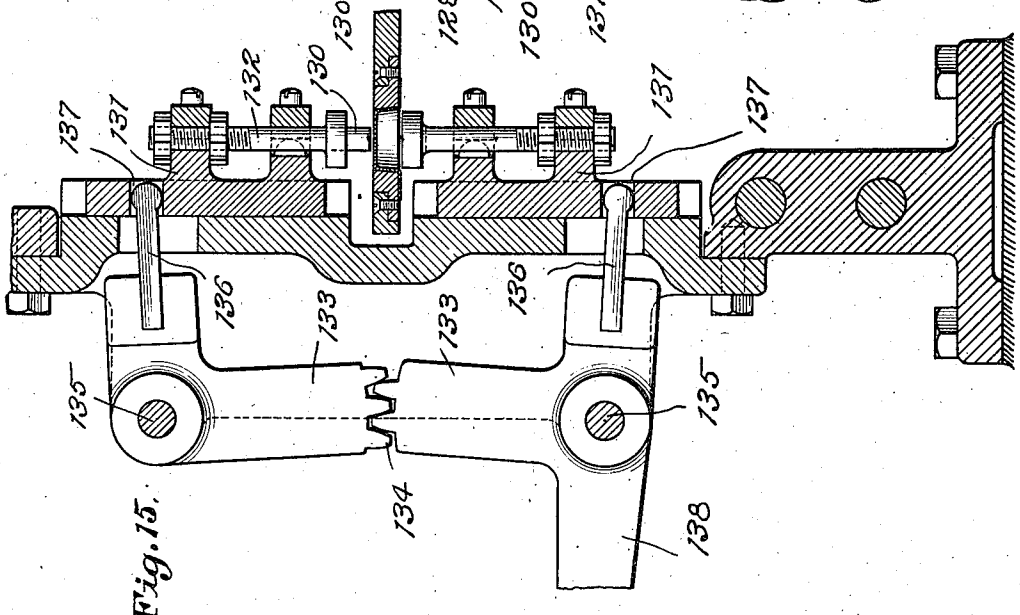


Fig. 15.

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Knight Bros

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CAP MAKING AND BOTTLING MACHINE.

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12 SHEETS—SHEET 9.

Fig. 17.

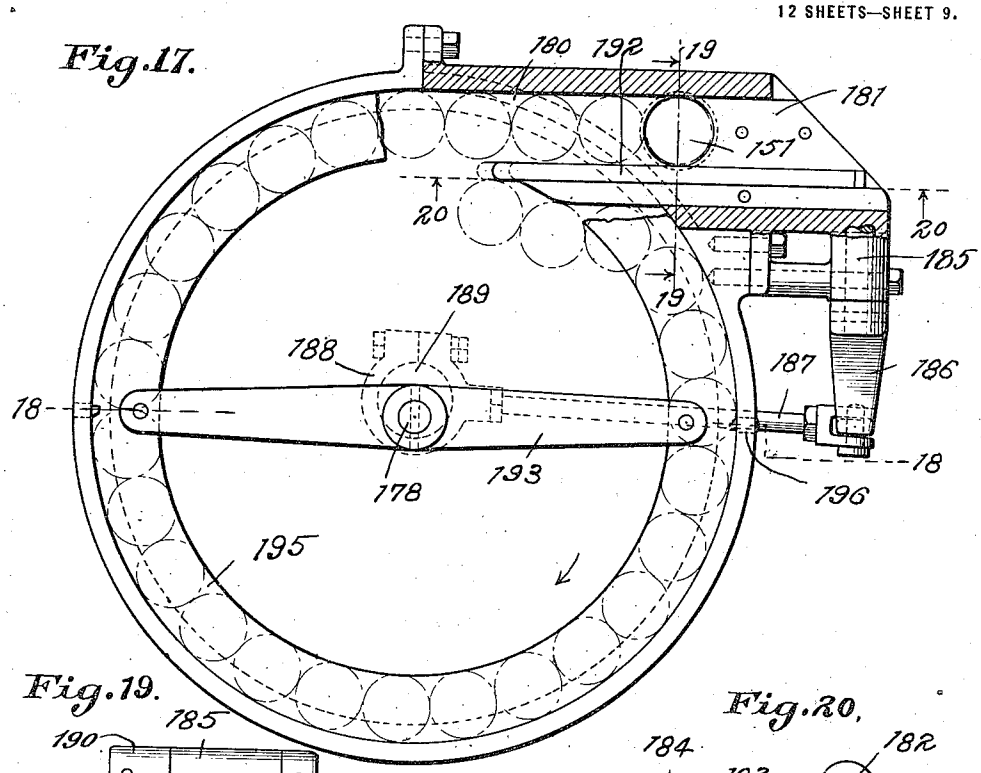


Fig. 19.

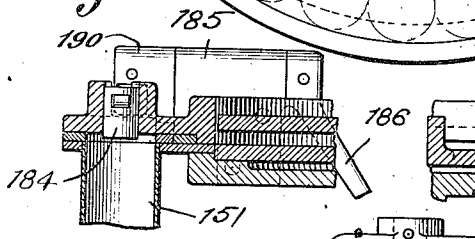
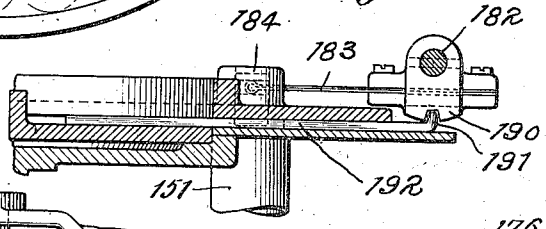


Fig. 20.



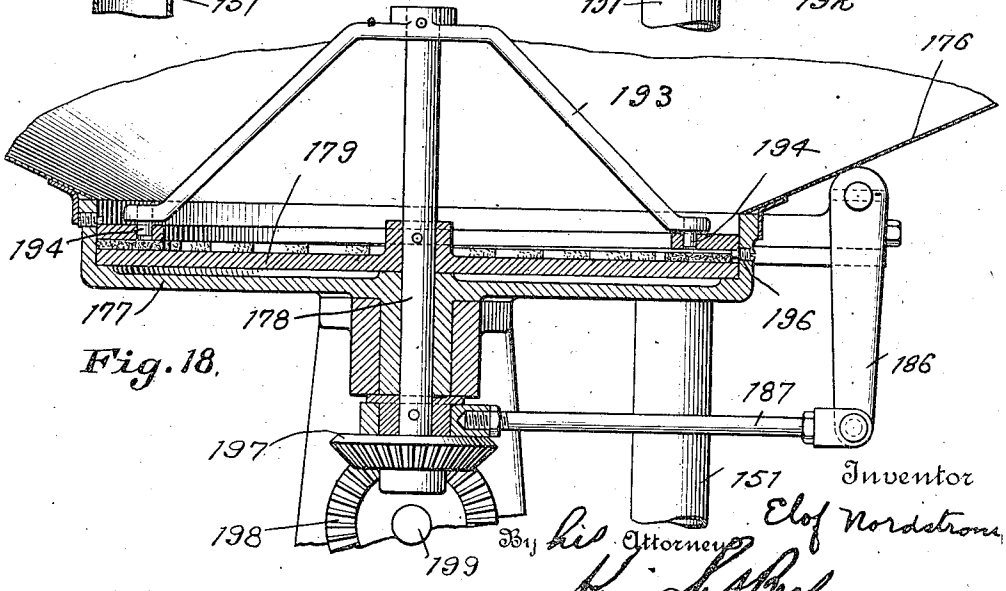


Fig. 18.

Inventor

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By his Attorneys

Knight Bros

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CAP MAKING AND BOTTLING MACHINE.

APPLICATION FILED AUG. 31, 1915.

1,212,665.

Patented Jan. 16, 1917.

12 SHEETS—SHEET 10.

Fig. 21.

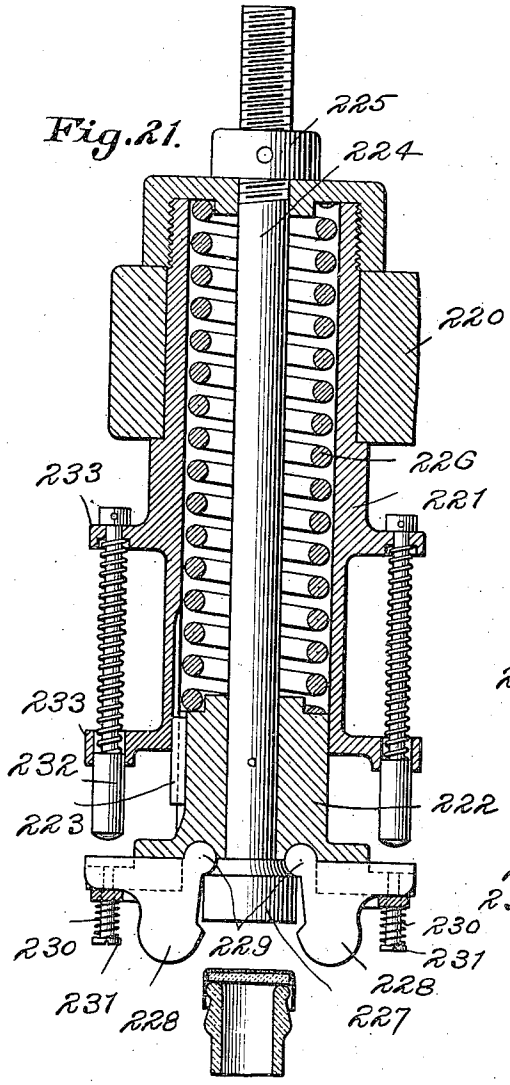


Fig. 22.

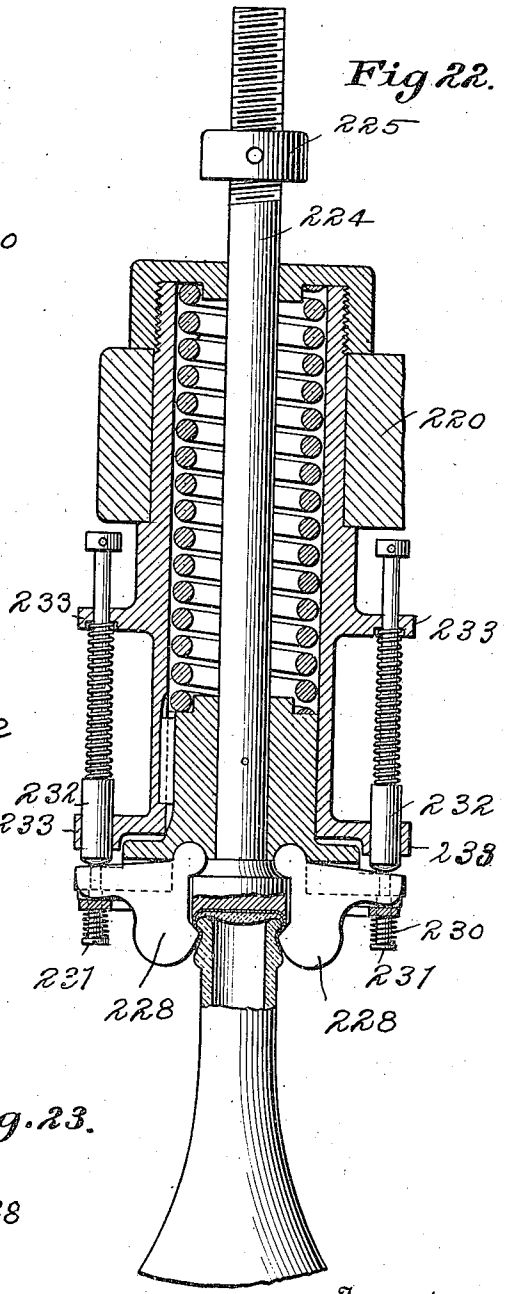
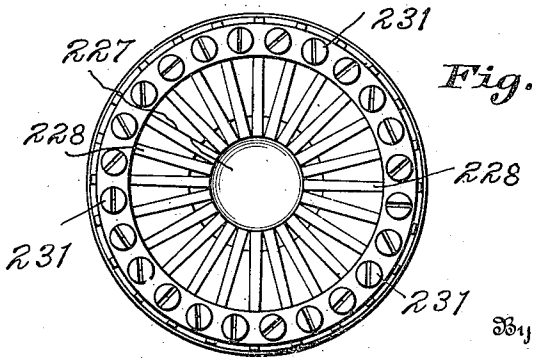


Fig. 23.



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CAP MAKING AND BOTTLING MACHINE.

APPLICATION FILED AUG. 31, 1915.

1,212,665. Patented Jan. 16, 1917.

12 SHEETS—SHEET 11.

Fig. 24.

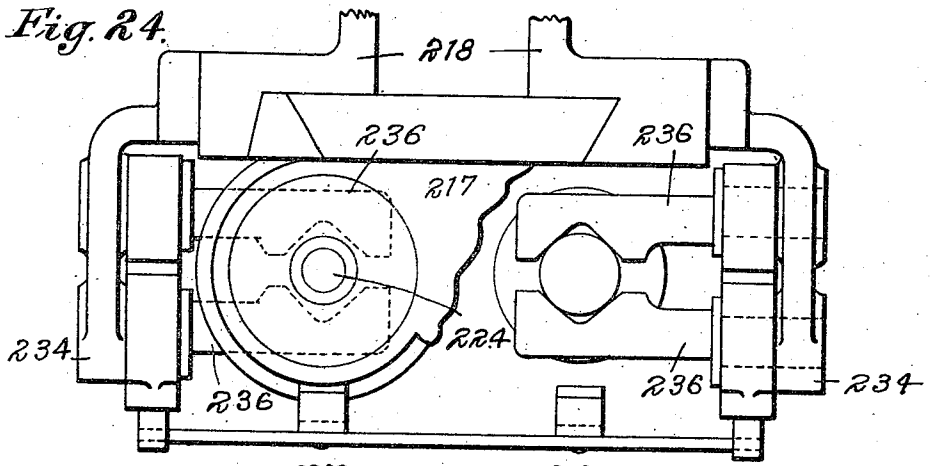
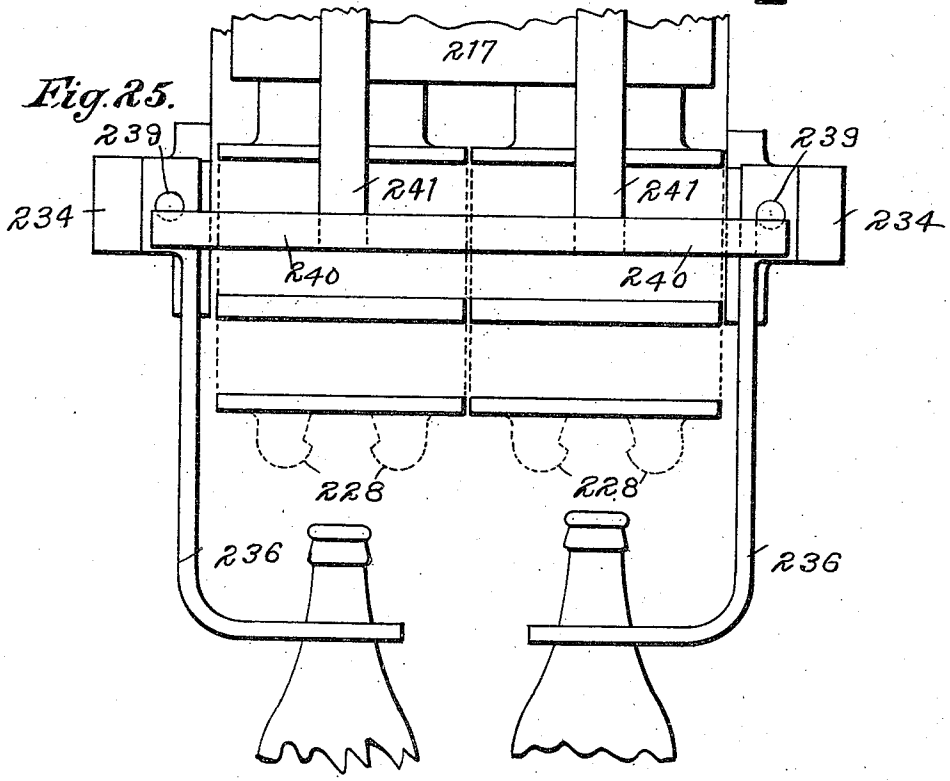


Fig. 25.



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E. NORDSTROM.

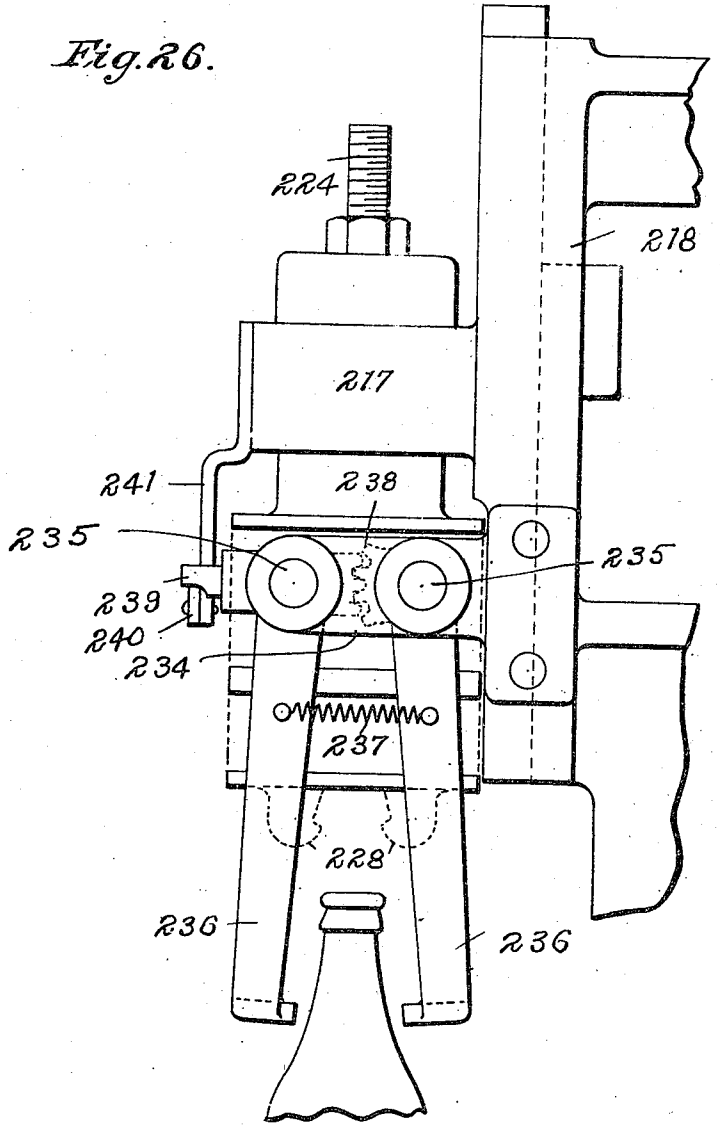
CAP MAKING AND BOTTLING MACHINE.

APPLICATION FILED AUG. 31, 1915.

1,212,665. Patented Jan. 16, 1917.

12 SHEETS—SHEET 12.

Fig. 26.



Inventor

Olof Nordstrom

By his Attorneys

Church & Church

UNITED STATES PATENT OFFICE.

ELOF NORDSTROM, OF NEWARK, NEW JERSEY, ASSIGNOR TO AMERICAN DAN STOPPER COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

CAP-MAKING AND BOTTLING MACHINE.

1,212,665. Specification of Letters Patent. Patented Jan. 16, 1917.

Application filed August 31, 1915. Serial No. 48,210.

To all whom it may concern:

Be it known that I, ELOF NORDSTROM, a citizen of the United States, and residing at Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Cap-Making and Bottling Machines, of which the following is a full and clear specification.

This invention relates to cap-making and bottling machines which automatically make caps and apply them to bottles or other vessels which are automatically presented in suitable position to be capped and removed after being capped.

The primary object of this invention is to provide an improved construction, combination, and arrangement of parts in a machine of this character for accomplishing these results continuously and in the proper order, as long as the machine is being operated.

One of the objects of my invention is to simplify the construction, raise the efficiency and increase the capacity of a machine of this character.

Toward the attainment of these objects, my invention contemplates the provision of blank punching and forming means of improved construction, improved means for feeding cork inserts and inserting the same into the caps, cap-applying means, improved means for feeding bottles or other vessels into and out of position to be capped, and cap-crimping means of improved construction.

Another object is to provide improved means for adapting the machine to work on bottles or other vessels of different sizes.

Other and further objects will appear in the specification and be pointed out in the appended claims, reference being had to the accompanying drawings which exemplify my invention in the preferred embodiment thereof.

In the drawings: Figure 1 is a front elevation of the preferred embodiment of my invention, parts being broken away; Fig. 2 is a top plan view of the same, parts being shown in section; Fig. 3 is a section on an enlarged scale corresponding to the line 3—3, Fig. 1; Fig. 4 is a section on an enlarged scale corresponding to the broken line 4—4, Fig. 1; Fig. 5 is a top plan view on an enlarged scale of a portion of the conveyer mechanism, parts being broken away; Fig. 6 is a side elevation of the same, parts being broken away and parts shown in section; Figs. 7 and 8 show different positions of portions of the feeding mechanism shown in Fig. 5; Fig. 9 is a section on the line 9—9, Fig. 8; Fig. 10 is a fragmentary plan view of the blank-forming mechanism on an enlarged scale, parts being shown in section; Fig. 11 is a section on the line 11—11, Fig. 10; Fig. 12 is a fragmentary detail section on the line 12—12, Fig. 10; Fig. 13 is a detail section on the line 13—13, Fig. 10; Fig. 14 is a front elevation on an enlarged scale of the blank-stamping mechanism, parts being shown in section; Fig. 15 is a section on the line 15—15, Fig. 14; Fig. 16 is a section on an enlarged scale corresponding to the line 16—16, Fig. 3; Fig. 17 is a top plan view on an enlarged scale of the cork-feeding apparatus, parts being broken away and parts shown in section; Fig. 18 is a section of the same corresponding to the line 18—18, Fig. 17; Fig. 19 is a section on the line 19—19, Fig. 17; Fig. 20 is a section on the line 20—20, Fig. 17; Fig. 21 is an axial section on an enlarged scale of one of the cap-crimping units, parts being shown in elevation; Fig. 22 is a similar view with the parts in other positions; Fig. 23 is a bottom plan view of the same; Fig. 24 is a bottom plan view of the crimping head having bottle locating device attached thereto, parts being broken away; Fig. 25 is a front elevation of the same, partly broken way; Fig. 26 is a side elevation of the same, partly broken away.

The frame 1, serves to mount a plurality of nuts 2, operated by an endless belt or band 3, for raising and lowering screws 4, said screws being arranged to carry the machine frame (see Figs. 1 and 4).

Referring to Fig. 3, a portion 6 of the framework mounts suitable brackets for journaling a shaft 7, carrying at one end a pulley 8. Said shaft carries at the other end a bevel gear 9, which meshes with a larger gear 10, keyed to a shaft 11. On the

other end of the shaft 11 is keyed a bevel gear 12, which meshes with a larger bevel 13. Bevel gear 13, shown in Fig. 3, is mounted on a shaft 14 (see Fig. 1) which carries a pulley 15 for driving an endless belt-conveyer 16 for bringing vessels up to the table 5 from the right of Fig. 1. As shown in Fig. 3, the vessels are presented to a rotary conveyer comprising spaced star wheels 17 mounted on a spindle 18 which is journaled in a suitable part of the framework. As shown best in Fig. 6, shaft 18 has keyed thereto a sprocket wheel 19, over which runs a chain 20 driven from a smaller sprocket 21 keyed to a shaft 22 (see Fig. 5). The shaft 22 carries a gear 23 which meshes with a gear 24 mounted on a spindle 25 which carries a bevel gear 26, said bevel 26 being in mesh with a similar gear 27 carried by the shaft 11. Coöperating with the rotary conveyer are suitable guides 28. As shown in Fig. 5, said rotary conveyer places the vessels successively into position to be engaged by a reciprocatory conveyer shown in Figs. 5, 6, 8 and 9. Keyed to the shaft 25 is a crank arm 29 to which one end of a connecting rod 30 is pivoted. The other end of said connecting rod is pivoted at 31 to an arm 32 which, as shown best in Fig. 9, is journaled in a slide 33. Rigid with the arm 32 is an upper arm 34 which is geared to a similar arm 35, which is also journaled within the slide 33. Arms 34 and 35 carry brackets 36 and 37, upon the outer ends of which a gripper bar 38 is pivotally mounted. Said gripper bar carries suitable grippers 39. A lever arm 32 is geared at 40 with a similar arm 32 journaled in another slide 33, the parts just described being duplicated on the other side of the feed-table and hence are given the corresponding reference numerals. As shown in Fig. 9, the feed-table 5 is provided with downwardly extending aprons, within which are formed dove-tailed guides which carry the slides 33. As shown best in Fig. 6, a crank arm 41 carried by the shaft 22 is connected to one end of a connecting rod 42, the other end of said connecting rod being pivoted on a pin 43 carried by one of a pair of interengaging arms 44, said arms being keyed to oppositely arranged pintles mounted in oppositely arranged slides 45, which are mounted in said dove-tailed grooves. The connecting rod 42 is thus adapted to simultaneously oscillate pivotally mounted arms 46 which are geared at 47^a for this purpose. Pivotally connected to the arms 46 on either side of the feed-table is a gripper bar 47 carrying suitable grippers 48.

It will be understood from this description by referring to Fig. 5, that the vessels which are presented from the right by the rotary conveyer are fed on to the table 5 in a position to be engaged by the grippers 39 which convey them one by one into position to have caps applied thereto by the mechanism to be hereinafter described. The rotary conveyer comprising star wheels 17 rotates once for every five revolutions of the shaft 25 and gear 24 carried thereby, the numbers of teeth of the gears 23 and 24 being suitably proportioned to impart two and one-half revolutions to gear 23 during the same time. It will therefore be seen that the gripper bars 38 are reciprocated two times to every once of the gripper bars 47. Each pair of said gripper bars are opened and closed for each reciprocation. In consequence, according to this preferred embodiment of my invention, two vessels are capped separately during the time that two vessels are conveyed together to the crimping mechanism to be hereinafter described. Leading away from a crimping mechanism (see Figs. 1 and 3) is an endless belt conveyer 49 which runs about a driving pulley 50 carried by a shaft 51 which carries a gear 52 (see Fig. 3) meshing with a bevel gear 53 on the left end of shaft 11, according to Fig. 3. The shaft 7 carries a bevel gear 54, which meshes with a bevel gear 55 keyed to an upright shaft 56. As shown in Fig. 1, the shaft 56 is journaled in the bracket 57 which projects from the upper frame of the machine, said bracket also serving to journal one end of a fly-wheel shaft 58 which carries a fly-wheel 59. Keyed to shaft 56 is a bevel gear 60, which meshes with a bevel gear 61 on the shaft 58. As shown in Fig. 2, said shaft 58 is also journaled in the bracket 62 and within a sleeve 63, said sleeve being journaled in a bearing 64. Keyed to the right end of shaft 58 is a cam 65 which is preferably formed as a housing for a pawl block 66, which, as shown in Fig. 4, is pivoted on a pin 67 and normally retained by a spring 68 in a position to engage a shoulder 69 mounted on a ratchet disk 70 which is keyed to the sleeve 63. Normally, therefore, the shaft 58 is adapted, when rotated, to drive the sleeve 63. Keyed to the inner end of sleeve 63 is a bevel gear 71, which meshes with a bevel gear 72 on the forward end of a shaft 73 which is journaled in spaced bearings 74. Keyed to the rear end of shaft 73 is an eccentric 75, provided with a strap 76 which is connected by a link 77 to a pin 78 carried by a crank arm 79 (see Fig. 4), said crank arm being keyed to the upper end of a vertical shaft 80. The lower end of said shaft 80 carries a crank arm 81 which is connected by a rod 82 with one arm of a bell crank lever 83 journaled at 84 in a bracket 85. The other arm of said lever is connected by a rod 86 to a universal coupling member 87 (see Figs. 3 and 11). Said coupling is carried by the depending

arm of a bell crank lever 88, which is journaled on a pin 89, said pin, as shown in Fig. 10, being carried by oppositely arranged slides 90 which are pressed apart by springs 91 which produce a certain degree of friction between said slides and the walls of the guides within which they move. The forwardly extending arm of the bell crank lever 88 carries a pin 92, which, as shown best in Fig. 13, is connected to a pair of spaced feed members 93 which are preferably provided with serrations along their upper edges, as shown in Fig. 11.

It will be understood from this description that each forward stroke of the rod 86 is resisted at first by the friction of the slides 90 in their grooves. As a result, bell crank lever 88 is oscillated on pin 89 to move the serrated edges of the feed bars 93 into engagement with the aluminum strip 94 which passes about a guide roller 95 on its way from a roll 96 of the stock from which the caps are to be stamped. The stock thus presented is moved between a fixed blank cutting die 97 and a metal plate 98, which is suitably mounted and apertured to guide a reciprocatory hollow plunger 99 with an upper edge adapted to cut a blank from the metallic strip at each stroke of said plunger. Secured to the lower end of the plunger 99 is a grooved collar 100 within which engage pins 101 carried by the bifurcated end of a lever 102 which is journaled on a pin 103 mounted in a vertical support 104. Connected to the other end of said lever is a connecting rod 105, the other end of said rod being connected at 106 (see Fig. 4) to one arm of a bell crank lever 107 which is journaled at 108. The upwardly projecting arm of lever 107 carries a cam roller 109 which runs in a cam groove 110 of a cam which is keyed to the shaft 73. A plate 250 which is carried by the collar 100, serves to reciprocably support a slide 251 to which is secured a trimming blade or knife 252 by means of screws 253. It will be understood therefore that at each upward stroke of the blank-cutting die, the knife 252 will sever the overhanging portion of the web from which blanks have been cut.

Referring to Figs. 1, 3 and 4 a bracket 111 serves to support a bearing 112. Within said bearing is journaled a shaft 113 which is supported from above and carries at its lower end a rotary plate or table 114. As seen in Fig. 3, this table is provided with peripheral notches 115 into which a locking bar or finger 116 is adapted to be moved by a spring 117 (see Fig. 3) at certain periodic intervals during the operation of the machine. A bolt or finger 116 is carried by a short shaft journaled in a bearing 118, said shaft also carrying the hub end of a lever arm 119. The other end of the lever 119 is connected to a vertically arranged cam rod 120 which carries at its upper end a cam roller 121. Said roller runs on a cam 122 mounted on the shaft 73. Periodically, therefore, the locking bolt 116 is forced out of engagement with a notch 115 against the action of the spring 117. Means for moving the table 114 at these times is provided as follows: Journaled on the shaft 113 is a pawl holding frame 123 which carries a pawl 124, said pawl being adapted to operate a ratchet 125 which is keyed to the shaft 113. A connecting rod 126 is connected at one end to the pawl holder 123 and its other end is connected to a crank arm 127 which is keyed to the vertical shaft 80. As shown best in Figs. 3 and 11, the rotary table 114 is provided with angularly spaced cap shaping dies 128, said dies being provided on either side, as shown best in Fig. 14, with apertures 129 for the accommodation of stamping plungers 130 which, in the present embodiment of my invention, are arranged in reciprocatory heads 131. Said heads also serve to mount centrally disposed plungers 132 which may be adapted to stamp any desired caption or legend on a cap contained within the die 128. Plungers 130 may have their coöperating surfaces suitably knurled to roughen the lobes of the cap. As shown in Fig. 15, a pair of lever arms 133 are geared together at 134 to move in unison about parallel pins 135. Both of said levers carry bolts 136 which interengage with suitable sockets 137 formed in the sliding heads 131. The lower lever 133 is provided with an arm 138 which, as shown in Fig. 4, is connected to a rod 139 united by a lost motion coupling 140 to a similar rod 141, which is provided with a spring 142 for normally retaining said rods apart. The upper end of rod 141 is connected at 143 to a cam lever 144 which, as shown in Fig. 2, carries a cam roller 145 which runs in a cam groove 146. As shown in Fig. 3, a crank arm 147, which is keyed to the vertical shaft 80, is connected at its outer end to a rod 148, said rod 148 being connected at its inner end to a slide 149. As shown best in Fig. 16, the slide 149 reciprocates in a bracket 150 across the lower end of a tubular chute 151, which normally contains a supply of cork inserts 152. By an inspection of Fig. 16 it will be seen that each stroke of slide 149 is adapted to remove the lowermost cork into the path of a plunger 153 which is connected by a rod 154 to the outer end of a lever arm 155 carried by the outer end of a shaft 156. By reference to Fig. 11, it will be seen that shaft 156 partakes of the movement of a lever 157 to one end of which is connected a collar 158 carried by the lower end of a plunger 159, which carries at its upper end a male die 160, which coöperates with the die 128 in shaping a cap. A collar 159′ which is se-

cured to the plunger 159 by means of a pin, serves as a slide for supporting the plunger 159 within the tubular plunger 99. The other end of lever 157 is connected at 161 to a rod 162, the upper end of said rod being connected by a lost motion coupling 163 with a similar rod 164, provided with spring 165 for normally spacing said rods. Rod 164 has its upper end connected to bent lever 144.

It will be seen from the foregoing description that after a cap blank has been stamped from the metal stock, the plunger 159 shapes the same into a cap within die 128. Table 114 is then rotated until the cap thus formed is brought under the stamps 130 and 132, as shown in Fig. 14. The cap here has its lobes roughened while any desired caption is impressed on the cap. The cap is next moved into the position shown in Fig. 16, in which a cork insert is forced upwardly thereinto. The upward travel of plunger 153 is made sufficient to force a cork insert far enough to be cramped within the cap, the taper of said cap as well as the positions of the lobes thereon being sufficient to resist this pressure. Said cap is then brought over the mouth of a vessel such as the bottle 166, shown in Fig. 4. As shown in dotted lines in Fig. 3, a pair of oppositely disposed bottle gripping arms 167 are journaled upon fixed parallel axes, being provided with arms 168 which are geared together to make said gripping arms operate in unison. One of said arms is carried by a sleeve 169 which, as shown in Fig. 1, is journaled in spaced bearings 170, and carries at its upper end a cam arm 171. A cam roller 172 mounted on the arm 171 traverses a cam 65, which moves the gripping arms 167 apart and a spring 167′ moves said arms together at regular intervals for supporting the bottles. Should there be a failure at any time in presenting a bottle to the capping mechanism, a feeler 173, which is mounted on the lower end of a vertical rod 174, is permitted under the action of a spring (not shown) to move inwardly. On the upper end of the rod 174 is keyed an arm 175, which by this movement, is swung into position beneath the tail of the dog 66. The pawl or dog 66 is thus forced inwardly and out of engagement with the shoulder 69, thus releasing sleeve 63 and throwing out of connection all of the mechanisms which coöperate in constructing the cap. Means for feeding cork inserts to the table are provided as follows: A hopper 176 is disposed at the upper end of chute 151, as shown best in Figs. 4, 17 and 18. Said hopper is provided with cupped bottom plate 177, within which is journaled a shaft 178. Keyed to the shaft 178 is a rotary disk or plate 179, which constitutes a conveyer for cork inserts. As shown in Fig. 17, the hopper is provided with a tangentially arranged discharge passage way 180, having an aperture in its bottom wall in register with the upper of the chute 151. A stop plate 181 limits the movement of the inserts along the passage 180 to the said aperture. As shown in Fig. 20, a rock shaft 182 carries a leaf spring 183, which supports at its outer end a plunger 184, which is coaxially mounted with the chute 151. Rock shaft 182 is journaled in bearing 185, (see Figs. 19 and 20) and carries a rock arm 186, which as shown in Fig. 17, is connected to a rod 187, the other end of said rod being connected to an eccentric strap 188, journaled upon an eccentric 189, said eccentric being keyed to shaft 178. As shown in Fig. 20, a block 190, which is keyed to rock shaft 182, is provided with a recess which fits the crooked end 191 of a slide or agitator 192. As shown in Fig. 17, this slide extends lengthwise of passage 180 and is suitably arranged along one side of said passage to aline the inserts as they pass into the discharge passage. As shown in Figs. 17 and 18, a yoke 193 is keyed to the upper end of shaft 178, the branches of said yoke being provided with pins 194, which engage in apertures formed in a plate ring 195, which is movably supported at slight inclination to rotary plate 179 by means of a stud 196. Keyed to the lower end of shaft 178 is a bevel gear 197, which meshes with a bevel gear, 198, keyed to a short shaft 199 which carries a sprocket wheel 200, driven by a chain 201 (see Fig. 4), which is in turn driven by a sprocket 202, keyed to shaft 58. It will be seen from this description that the rotary movement of plate 179 will tend to throw the cork inserts outwardly under the action of centrifugal force. During this action, the ring 195 permits only a single layer of inserts to be passed in a clock-wise direction around the hopper, according to Fig. 17, a movement which delivers them tangentially into the passage way 180.

After the caps have been applied, which is accomplished by a plunger 203 (see Fig. 4), the vessels are passed on to the crimping mechanism to be presently described. Connected to the upper end of plunger 203, which is mounted in spaced bearings 204, is a bent lever 205, which is journaled on a pin 206. The upper arm of said lever is connected by a rod 207 to a lost motion coupling 208 to another rod 209 which is connected at 210 with cam lever 107. It will be seen, therefore, that plunger 203 is periodically depressed to apply caps from dies 128 to the necks of bottles presented thereto.

Referring now to Figs. 1 and 3, a bevel gear 211 which is keyed to shaft 58, meshes with another bevel 212 keyed to a shaft 213. As shown in Fig. 3, shaft 213 carries a cam block 214 provided with a cam groove 215 within which travels a cam roller 216 which

is mounted upon a slide 217, reciprocably mounted in a dove-tailed guide 218. As shown in Fig. 2, the slide 217 carries a crimping head 219, comprising two adjacently disposed crimping elements shown in detail in Figs. 21, 22 and 23. A band 220 carried by slide 217 serves to support a socket 221 within which is reciprocably mounted a slide 222, held against rotation by means of a spline 223. The slide 222 is carried by a rod 224, which passes through the upper end of socket 221 and is limited in its downward movement by a cap or nut 225. Interposed between the upper end of the socket and the slide 222 is a spring 226. The lower end of the rod 224 carries a cap-engaging member 227. Radially disposed with respect to said member 227 are a plurality of crimping elements 228 which oscillate about their rounded lugs 229. The elements 228 project through radial slots in slide 222 and are normally held in outward position by means of springs 230, which are carried by studs 231 on projecting portions of slide 223. As indicated in Figs. 21 and 22, whenever the socket 221 is forced downwardly, the member 227 rests upon the cap and forces it into the position shown in Fig. 22. When the slide 222 is brought to rest, a plurality of plungers 232 which are mounted in flanges 233, are forced down on to the elements 228 so as to move them into the position shown in Fig. 22, thus crimping the cap and firmly securing it to the vessel.

Referring now to Figs. 24, 25 and 26, it will be seen that the guide 218 is provided on opposite sides of the reciprocating crimping head, with forwardly extending brackets 234. Pins 235 carried by these brackets, serve to journal the hub portions of vessel clamping levers 236, which are normally drawn toward each other in pairs by connecting springs 237. Said clamping levers are provided with interengaging segmental arms 238. Projecting from the front lever of each pair of said levers is a lug 239, said lugs being suitably arranged to be engaged simultaneously by a bar 240 which is connected to the slide or crimping head 217 by straps 241.

The operation of the several parts has been described in the specification. The general operation will now be readily understood, and briefly related is as follows: In the present embodiment, the vessels are fed under the capping mechanism, one by one, the cap having been constructed by stages in the manner hereinbefore pointed out. After a cap is applied to a vessel said vessel is replaced by another vessel to be capped. Said vessels are next fed in pairs under the crimping mechanism, which is relatively slow in its action and requires greater power to operate it. This construction thus permits the relatively heavy work performed by the crimper to be done by a slow movement mechanism which accommodates the vessels which are capped in the rapidly operated cap-applying mechanism.

What I claim is:—

1. In a machine of the character described, the combination with means for applying caps to vessels, of means for securing caps to said vessels, means for feeding vessels to and from said cap-applying means, and means operating at a different rate of speed for feeding a different number of vessels from the first mentioned feeding means to and from said cap-securing means, each of said feeding means being adapted to move said vessels in one direction only.

2. In a machine of the character described, cap-applying means which act at relatively short intervals, cap-securing means which act at relatively long intervals on a relatively larger number of vessels, means for feeding vessels to and from said cap-applying means, and means for feeding said vessels to and from said cap-securing means, said feeding means being adapted to move the vessels only in one direction.

3. In a machine of the character described, the combination with blank forming means, of a cap shaping die, means for moving said blank forming means and cap shaping die into and out of juxtaposition, means for displacing a blank from said blank forming means and shaping it into a cap in said die, means for feeding vessels into and out of position to have caps applied thereto, and means for displacing caps from said dies on to said vessels.

4. In a machine of the character described, blank-forming means, a cap shaping die, means for bringing said blank-forming means and cap-shaping die into suitable relative positions to have a blank displaced from said blank-forming means into said cap-shaping die, means whereby said die and a receptacle may be brought into suitable relative positions to have a cap in said die applied to said receptacle, and means for applying caps from said die to receptacles.

5. In a machine of the character described, blank-forming means, a cap shaping die, means for bringing said blank-forming means and cap-shaping die into suitable relative positions to have a blank displaced from said blank-forming means into said cap-shaping die, means whereby said die and a receptacle may be brought into suitable relative positions to have a cap in said die applied to said receptacle, and means for applying caps from said die to receptacles, said cap-shaping die being presented downwardly and suitably mounted to move successively into positions over said blank-forming means and a receptacle to be capped.

6. In a machine of the character described, blank-forming means, a cap-shaping die movable successively into positions adjacent said blank-forming means and over a receptacle to be capped, a reciprocable plunger for displacing a blank from said blank-forming means and shaping it into a cap in said die, means for feeding receptacles into position to be capped, and means for applying caps from said die on to said vessels.

7. In a machine of the character described, a blank-cutting die, means for feeding stock to said die, means coöperating with said die for cutting a blank from said stock, a rotary table provided with a cap-shaping die, the rotary axis of said table being suitably disposed to move said die into and out of coaxial alinement with said blank-cutting die, means for forcing a blank from the blank-cutting die into said cap-shaping die to shape a cap, and means disposed at a distance from said blank-cutting die for discharging a shaped cap from the cap-shaping die.

8. In a machine of the character described, a blank-cutting die, means for feeding stock to said die, means coöperating with said die for cutting a blank from said stock, a rotary table provided with a cap-shaping die, the rotary axis of said table being suitably disposed to move said die into and out of coaxial alinement with said blank-cutting die, means for forcing a blank from the blank-cutting die into said cap-shaping die to shape a cap, means for discharging a shaped cap from the cap-shaping die, and means for feeding vessels into position to receive the caps displaced from the cap-shaping die.

9. In a machine of the character described, the combination of blank-cutting means, means for presenting vessels to be capped, and a cap-shaping die suitably mounted to receive a blank directly from said blank-cutting means and to be moved into position over a vessel to be capped.

10. In a machine of the character described, the combination of blank-cutting means, and cap-shaping means adapted to move the blank from said blank-cutting means, a portion of said cap-shaping means being suitably mounted and adapted to convey a cap into position to be applied to a vessel.

11. In a machine of the character described, a hopper provided with a discharge outlet, a rotary bottom plate, and an annulus spaced therefrom and rotatable on an axis inclined relatively to the rotary axis of said bottom plate.

12. In a machine of the character described, a hopper provided with a discharge outlet, a rotary bottom plate, and an annulus spaced therefrom and rotatable on an axis inclined relatively to the rotary axis of said bottom plate, said bottom plate being substantially level.

13. In a machine of the character described, a hopper, a substantially vertical shaft extending through said hopper, a bottom plate keyed to said shaft, an annular plate arranged above said bottom plate, means for supporting one edge of said annular plate, said annular plate being adapted to rest on the articles to be fed at points distant from said supporting means, and means for connecting said annular plate to said shaft.

14. In a machine of the character described, the combination with cap-applying means and cap-securing means, of means for feeding vessels to said cap-applying and cap-securing means successively, said feeding means including two pairs of reciprocable slides, each pair of slides being reciprocable relatively to the other pair of slides, means suitably mounted on said slides to be moved into and out of engagement with vessels that are being fed, power-driven crank arms connected respectively to said pairs of slides, the vessel engaging means carried by one pair of slides being adapted to deposit vessels within the reach of the vessel engaging means carried by the other pair of slides, and means for revolving said crank arms at different speeds.

15. In a machine of the character described, a hopper for inserts provided with a discharge outlet, a rotary bottom disk or plate in said hopper, and a rotary annulus inclined relatively to said disk or plate, and means for rotating said plate and annulus in a direction to convey the inserts toward said outlet.

16. In a machine of the character described, a hopper for inserts, a vertical shaft extending through the bottom wall of said hopper, a rotary disk or plate connected to said shaft, an annulus spaced from said rotary disk or plate, means for driving said annulus from said shaft, said hopper being provided with a tangentially arranged outlet passage, a chute leading from said outlet passage, and means for forcing inserts from said tangentially arranged outlet into the upper end of said chute, and means for connecting said forcing means to said vertical shaft.

17. In a machine of the character described, a rotary table carrying a plurality of cap-shaping dies, a blank-cutting die suitably arranged to have said dies successively register therewith, means for feeding stock to said blank-cutting die, a cap-shaping plunger, a blank-cutting plunger, and a trimmer operated by one of said plungers.

18. In a machine of the character described, a hopper for inserts, a chute for

inserts, a reciprocable slide for feeding inserts to the mouth of said chute, a plunger for driving said inserts from the slide down into said chute, and means for alternately operating said slide and plunger.

19. In a machine of the character described, a blank-cutting device, a pair of spaced grippers for feeding stock to said device, a reciprocating slide of less width than the space between said grippers, a lever pivotally mounted on said slide and arranged with one end projecting between said grippers, means for movably connecting said lever end to said grippers, and means for oscillating said lever.

20. In a machine of the character described, a blank-cutting device, spaced guides extending toward said device, slides mounted in said guides respectively, means yieldably forcing said slides apart into said guides, a pin carried by said slides, a bell crank lever pivoted on said pin, means carried by one arm of said lever for feeding stock to said device, and means connected to the other arm of said lever for oscillating said lever and reciprocating said slides.

21. In a machine of the character described, the combination with means for applying caps to vessels, of means for securing caps to said vessels, and means for feeding vessels to said capping and cap-securing means successively, said feeding means comprising oppositely arranged slides reciprocable in the direction of feed of said vessels, a plurality of oscillatory levers mounted on each of said slides, and a gripper carried by all of said oscillatory levers on each slide.

22. In a machine of the character described, the combination with means for applying caps to vessels, of means for securing caps to said vessels, and means for feeding vessels to said capping and cap-securing means successively, said feeding means comprising oppositely arranged slides reciprocable in the direction of feed of said vessels, oscillatory levers mounted to swing about parallel vertical axes on each of said slides, and a gripping bar carried by the oscillatory levers on each slide, said bar having pivotal connection with each of said levers on an axis parallel to the oscillatory axes of said levers.

23. In a machine of the character described, the combination with means for applying caps to vessels, of means for securing caps to said vessels, and means for feeding vessels to said capping and cap-securing means successively, said feeding means comprising oppositely arranged slides reciprocable in the direction of feed of said vessels, oscillatory levers mounted on said slides and geared together to swing in unison in a direction transverse to the direction of feed, and oppositely arranged gripping bars, each of said gripping bars being connected to all of the oscillatory levers on the slide by which it is carried.

24. In a machine of the character described, the combination with means for applying caps to vessels, of means for securing caps to said vessels, and means for feeding vessels to said capping and cap-securing means successively, said feeding means comprising oppositely arranged slides reciprocable in the direction of feed of said vessels, a pair of levers pivotally mounted on each of said slides and having their adjacent ends operatively connected to move in unison, and a gripper bar connected to the other ends of said levers on each slide.

25. In a machine of the character described, the combination with cap-applying means and cap securing means, of means for feeding vessels to said cap applying and cap securing means successively, said feeding means including a plurality of pairs of reciprocable slides arranged opposite to each other, means suitably mounted on said slides to move into and out of engagement with vessels that are being fed, interengaging arms connecting each pair of said slides and power-driven crank arms each of which is connected to one of the interengaging arms for each pair of slides.

26. In a machine of the character described, the combination with cap applying means and cap securing means, of means for feeding vessels to said cap applying and cap securing means successively, said feeding means including a plurality of pairs of vessel gripping instrumentalities oppositely arranged, means for moving said instrumentalities into and out of gripping engagement with vessels which are being fed by them, and means for relatively reciprocating said pairs of instrumentalities, said pairs of instrumentalities being respectively adapted to move different numbers of vessels at each stroke, and said relatively reciprocating means being adapted to reciprocate said instrumentalities at differently timed intervals for this purpose.

27. In a machine of the character described, the combination of cap applying and cap crimping means, a feed table extending by said means, means reciprocable relatively to said cap applying means for moving vessels up to be capped and away after being capped, other means reciprocable relatively to said crimping means for moving said vessels from where the first mentioned reciprocable means leaves them up to the crimping means and away therefrom, and means for feeding vessels on to said feed table, said feed table being provided with a guide wall for directing vessels on to said table, and said feeding means including means for feeding said vessels along said guide wall onto said table and within reach of the first mentioned reciprocable means.

28. In a machine of the character described, the combination of cap applying and cap crimping means, a feed table extending by said means, means reciprocable relatively to said cap applying means for moving vessels up to be capped and away after being capped, other means reciprocable relatively to said crimping means for moving said vessels from where the first mentioned reciprocable means leaves them up to the crimping means and away therefrom, and means for feeding vessels on to said feed table, said feeding means including a conveyer for carrying vessels up to said table, a rotary conveyer for removing the vessels from the first mentioned conveyer on to said feed table within reach of the first mentioned reciprocable means, and a guide wall for coöperating with said rotary conveyer in directing the movements of said vessels.

29. In a machine of the character described, the combination with capping mechanism, of vessel feeding mechanism including oppositely arranged reciprocable slides, a pair of levers pivotally mounted on each of said slides, the adjacent ends of said levers being geared together, vessel grippers mounted on the other ends of said levers, transverse arms carried respectively by one lever of each pair, said arms being geared together to move in unison, and means connected to one of said arms for reciprocating said slides and moving said grippers into and out of engagement with vessels that are being fed.

30. In a machine of the character described, the combination of vessel capping means, cap crimping means, and means for feeding vessels to said capping and cap crimping means successively, said crimping means including a reciprocable socket, a plunger reciprocably mounted in said socket, a yieldably mounted slide in said socket for normally holding said plunger in an extreme position with respect to said socket, crimping elements carried by said slide in normally inoperative position, and means operated by the relative movement of plunger and socket for moving said crimping elements, said crimping element moving means comprising plungers yieldably mounted on said socket and adapted to impinge said crimping elements during every stroke of said crimping means.

31. In a machine of the character described, the combination of means for forming the shell of a cap, means for putting inserts into said caps, a hopper, a chute leading from said hopper to said putting in means, and means for feeding inserts from said hopper into said chute, said feeding means including a revoluble disk or plate, a tangential runway leading from said disk or plate to the upper end of said chute, and means revolving within said hopper and above said disk or plate in a direction to move the inserts into said runway.

32. In a machine of the character described, the combination of means for forming the shell of a cap, means for putting inserts into said caps, a hopper, a chute leading from said hopper to said putting in means, and means for feeding inserts from said hopper into said chute, said feeding means including a revoluble disk or plate, a tangential runway leading from said disk or plate to the upper end of said chute, and means revolving within said hopper in a direction to move the inserts into said runway, said runway being provided with a slide reciprocable lengthwise thereof.

33. In a machine of the character described, a hopper for inserts, said hopper being provided with a revolving disk or plate constituting the bottom thereof, a tangential runway leading therefrom, a reciprocable slide extending lengthwise of said runway, and a chute leading from said runway.

34. In a machine of the character described, a hopper for inserts, a rotary plate or disk in the bottom of said hopper, said hopper being provided with a runway leading therefrom, and an annulus spaced from said plate or disk a distance substantially the thickness of said inserts, said annulus being movable relatively to said rotary plate.

35. In a machine of the character described, a hopper for inserts, a rotary plate or disk in the bottom of said hopper, said hopper being provided with a runway leading therefrom, and an annulus spaced from said plate or disk a distance substantially the thickness of said inserts, said annulus being inclined slightly to the plane of said rotary plate or disk.

36. In a machine of the character described, a hopper for inserts, a rotary plate or disk in the bottom of said hopper, said hopper being provided with a runway leading therefrom, an annulus spaced from said plate or disk a distance substantially the thickness of said inserts, and means for moving said annulus relatively to said plate or disk.

37. In a machine of the character described, a hopper for inserts provided with a discharge passage, a rotary disk or plate mounted in said hopper, and a rotary annulus spaced from said disk or plate, means for rotating said plate and annulus in a direction to convey the inserts toward said outlet, and means for moving said annulus toward and away from said disk or plate.

38. In a machine of the character described, a hopper for inserts, a vertical shaft

extending through the bottom wall of said hopper, a rotary disk or plate connected to said shaft, an annulus spaced from said rotary disk or plate and means for driving said annulus from said shaft, said hopper being provided with a tangentially arranged outlet passage.

39. In a machine of the character described, a hopper for inserts, a vertical shaft extending through the bottom wall of said hopper, a rotary disk or plate connected to said shaft, an annulus spaced from said rotary disk or plate, means for driving said annulus from said shaft, said hopper being provided with a tangentially arranged outlet passage, a chute leading from said outlet passage, means for controlling the passage of inserts into the upper end of said chute, and means for operatively connecting said controlling means with said shaft.

40. In a machine of the character described, a hopper for inserts, a chute for inserts, means for feeding said inserts to said chute, a shaft for driving said feeding means, and means operated by said shaft for controlling the passage of inserts into said chute, said controlling means including a rock shaft driven by the first mentioned shaft, an arm keyed to said rock shaft, an agitator connected to said arm to be moved toward and away from the upper end of said chute, and a plunger connected to said rock shaft and suitably arranged to be moved into and out of the opening into said chute.

41. In a machine of the character described, a hopper provided with an outlet, a chute leading from said outlet, a shaft journaled in a wall of said hopper and carrying means for feeding inserts toward said outlet, a rock shaft means connecting said shafts to oscillate said rock shaft, and an agitator connected to said rock shaft and arranged to move to and fro between said hopper and the upper end of said chute.

42. In a machine of the character described, a hopper provided with an outlet, a chute leading from said outlet, a shaft journaled in a wall of said hopper and carrying means for feeding inserts toward said outlet, a rock shaft means connecting said shafts to oscillate said rock shaft, and an agitator connected to said rock shaft and arranged to move to and fro between said hopper and the upper end of said chute, said rock shaft being provided with means for displacing the inserts downwardly into said chute.

43. In a machine of the character described, means for applying caps to vessels, means for driving the same, means for feeding said vessels into and out of position to receive caps from said cap-applying means, and means operated by said driving means for temporarily clamping a vessel in position to have a cap applied thereto, said clamping means including clamping arms movable about parallel axes, said clamping arms being suitably connected to move together, and means for connecting one of said arms to said driving means.

44. In a machine of the character described, means for applying caps to vessels, means for driving the same, means for feeding said vessels into and out of position to receive caps from said cap-applying means, and means operated by said driving means for temporarily clamping a vessel in position to have a cap applied thereto, said clamping means including a pair of clamping arms yieldably connected for drawing them into clamping engagement with a vessel, said arms being provided with interengaging portions to move them in unison, a spindle carrying one of said arms, and means periodically operated by said driving means for moving said spindle to move said clamping arms against the action of said spring.

45. In a machine of the character described, means for constructing a cap and applying it to a vessel, means for driving the same, including a releasable clutch, means for feeding a vessel into and out of position to be capped, an oscillatable shaft carrying an element movable into and out of position to operate said clutch, an instrumentality movable into and out of engagement with a vessel in position to have a cap applied thereto, said shaft being operated by said instrumentality, a sleeve journaled on said shaft, said sleeve being operated by said driving means, and means operated by said sleeve for temporarily clamping a vessel in position to be capped.

46. In a machine of the character described, means for constructing a cap and applying it to a vessel, means for driving the same, including a releasable clutch, means for feeding a vessel into and out of position to be capped, an oscillatable shaft carrying an element movable into and out of position to operate said clutch, an instrumentality movable into and out of engagement with a vessel in position to have a cap applied thereto, said shaft being operated by said instrumentality, a sleeve journaled on said shaft, said sleeve being operated by said driving means, and means operated by said sleeve for temporarily clamping a vessel in position to be capped, said clutch being provided with a cam surface and said sleeve being provided with cam arm operated thereby.

47. In a machine of the character described, means for constructing and applying caps to vessels, means for feeding vessels into position to be capped, an instrumen-

tality suitably disposed to be engaged by a vessel as it moves into position to be capped, a drive shaft, a sleeve on said drive shaft, means for connecting said sleeve to said cap constructing and applying means, and means operated by said instrumentality for releasably connecting said drive shaft to said sleeve, said means for releasably connecting said drive shaft to said sleeve comprising a member rigid on said sleeve, a dog movable into and out of clutching engagement with said member on the sleeve, and an arm connected to said instrumentality to be moved into and out of position to operate said dog.

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