July 17, 1934. G. J. MEYER 1,966,511

CAP FEEDING APPARATUS

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FIG. 1

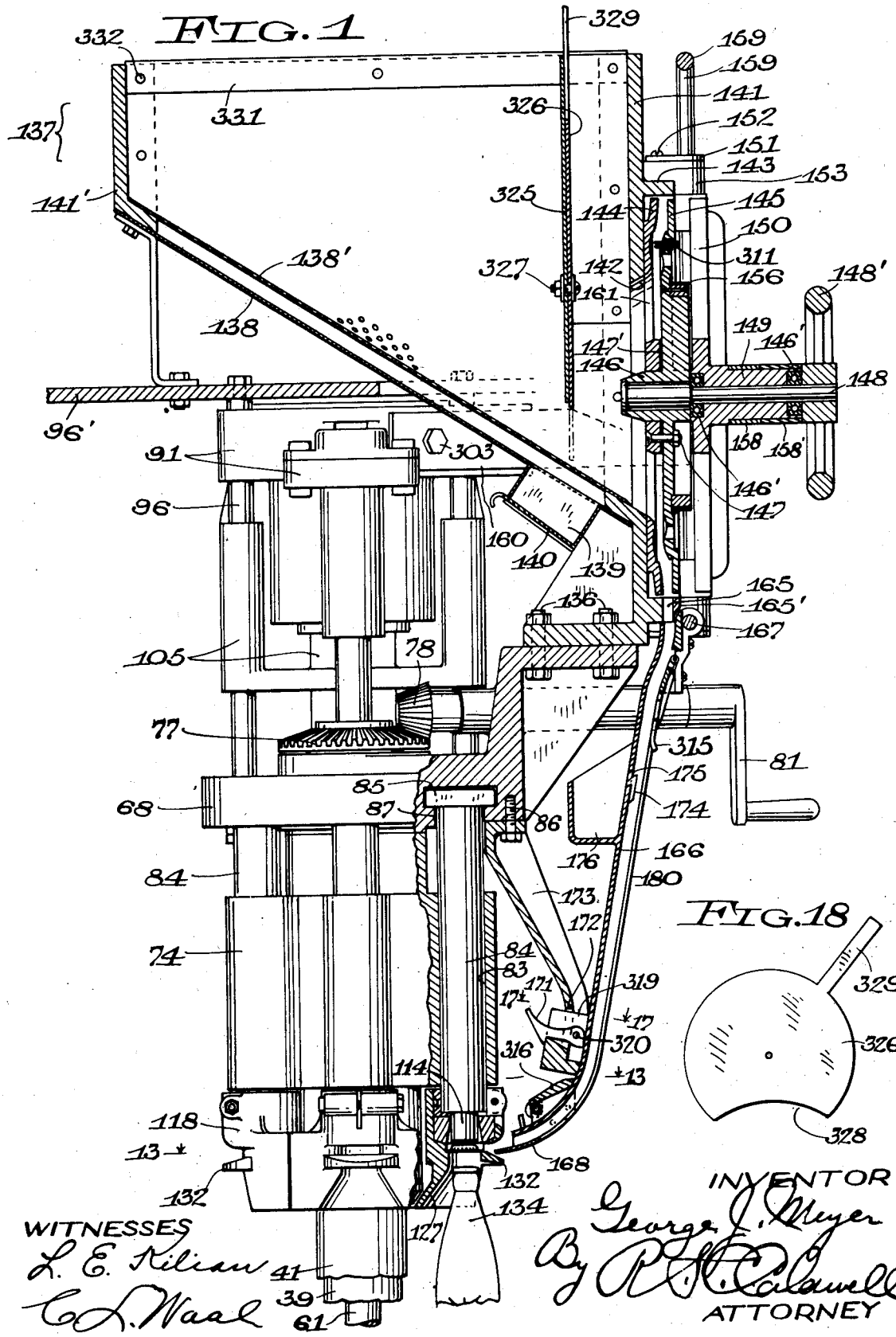


FIG. 18

WITNESSES

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CAP FEEDING APPARATUS

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FIG. 2

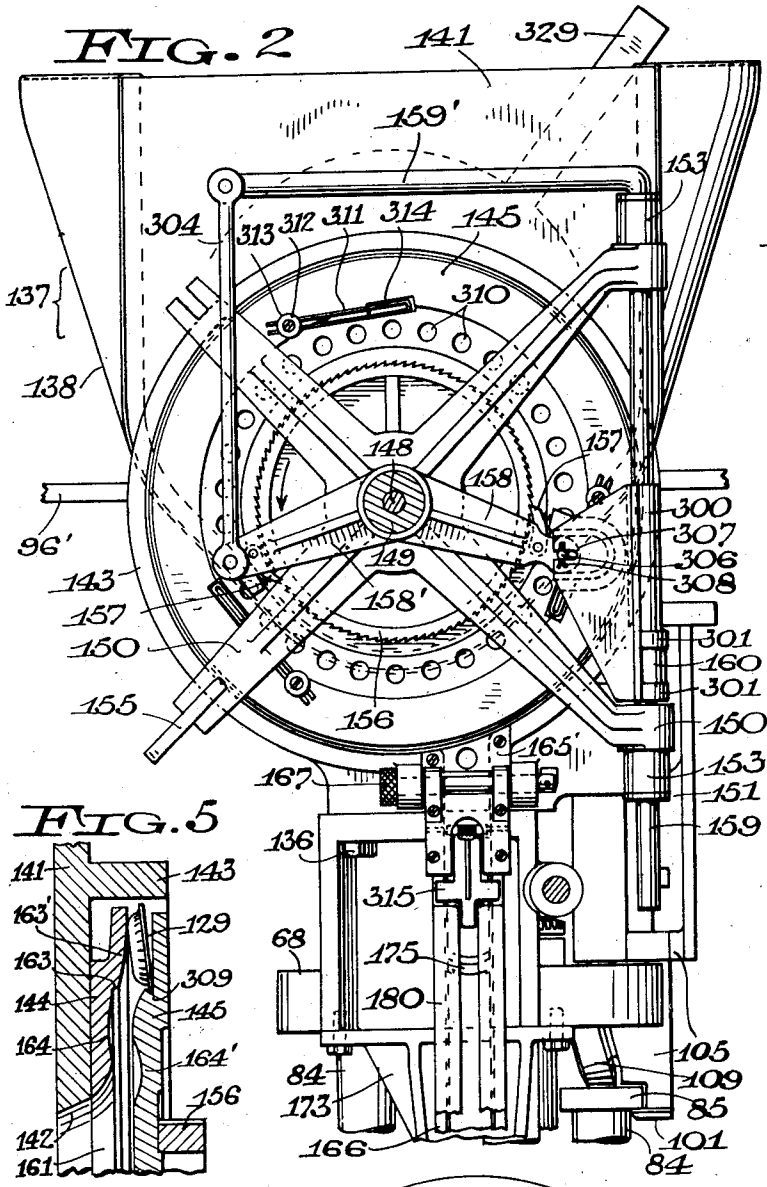


FIG. 3

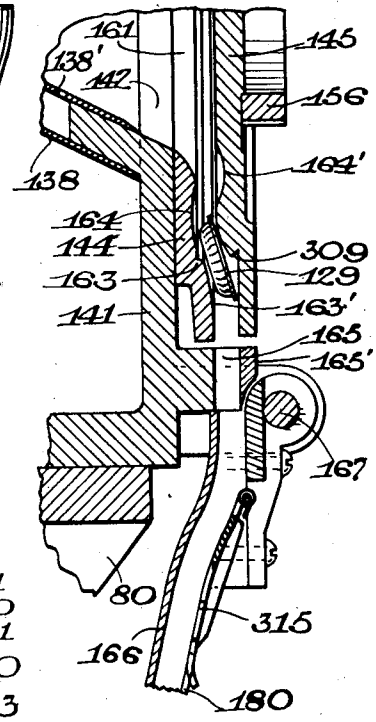


FIG. 5

FIG. 4

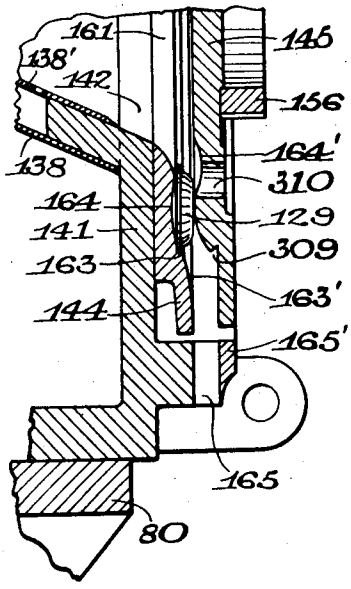
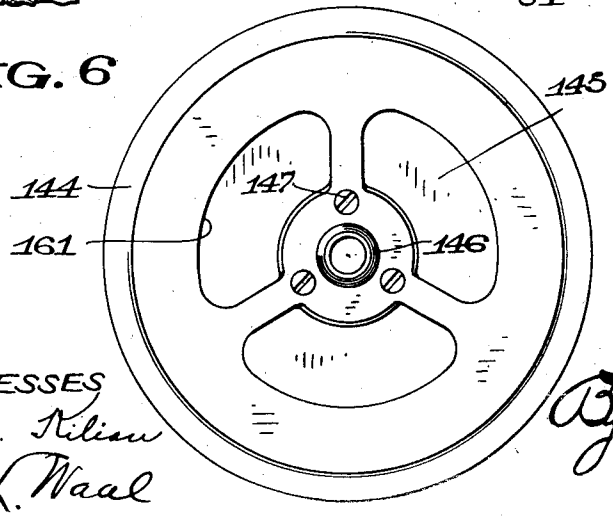


FIG. 6



WITNESSES

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CAP FEEDING APPARATUS

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FIG. 7

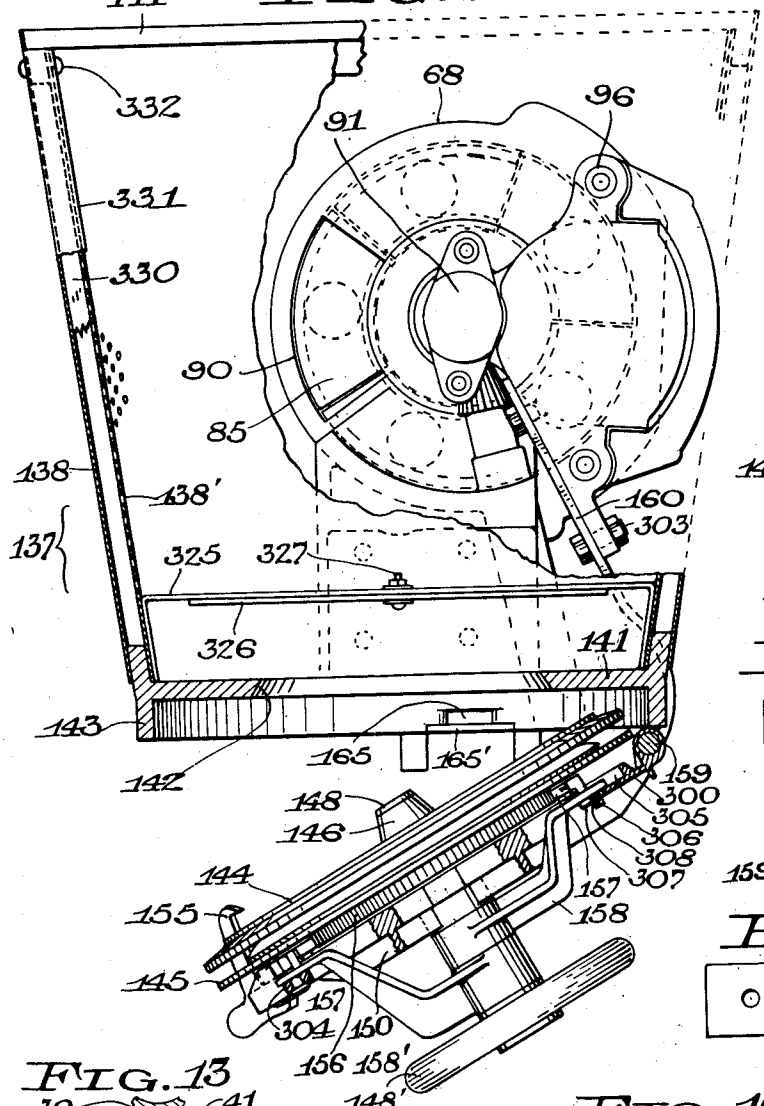


FIG. 8

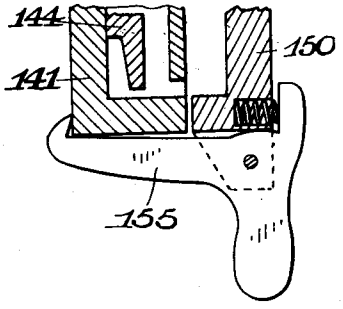


FIG. 9

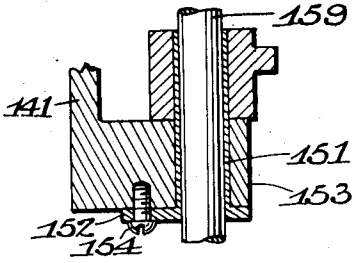


FIG. 10

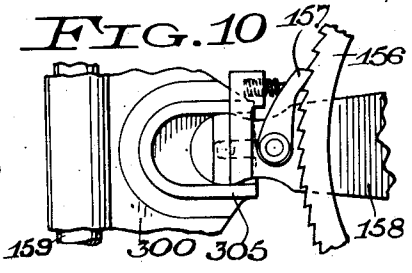


FIG. 11

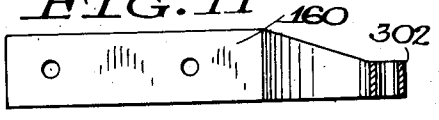


FIG. 13

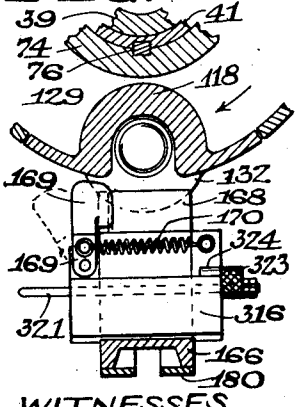


FIG. 14

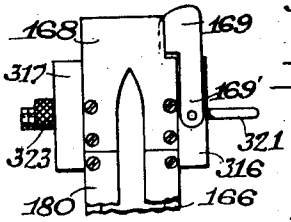


FIG. 16

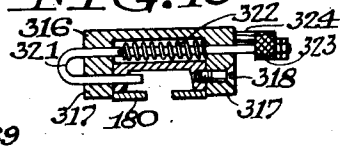


FIG. 12

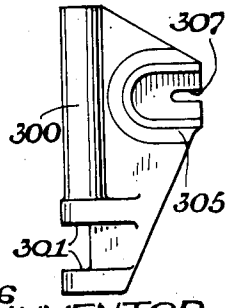


FIG. 17

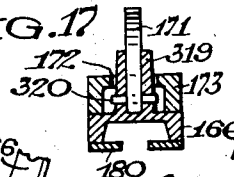
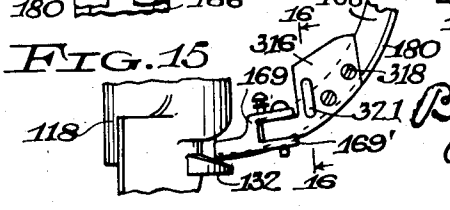


FIG. 15



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UNITED STATES PATENT OFFICE

1,966,511

CAP FEEDING APPARATUS

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Application September 14, 1932, Serial No. 633,060

12 Claims. (Cl. 226—88.1)

The invention relates to bottle capping machines and more particularly to cap feeding apparatus for such machines.

An object of the invention is to provide cap feeding apparatus including a rotary cap selector having spaced walls between which the caps are received for properly entering the caps in a delivery chute, the construction of the selector being such as to minimize abrasion of the caps.

Another object of the invention is to provide cap feeding apparatus including a cap hopper having an interior perforated bottom for facilitating removal of foreign matter from the caps.

A further object of the invention is to provide cap feeding apparatus in which the cap selector is hinged on the hopper to permit ready access to the interior of the hopper and selector, the selector having a driving connection which is not disturbed by the opening of the selector.

A further object is to provide a valved wall in the hopper to control the flow of caps to the selector and to minimize pressure on the selector.

A further object is to provide simple but effective means in the delivery chute for facilitating the removal of the defective caps.

A further object is to perfect details of construction generally.

This application constitutes a continuation in part of my application for Bottle capping machines, Serial No. 494,657, filed November 10, 1930.

In the accompanying drawings, Fig. 1 is a sectional elevation of a bottle capping machine having cap feeding apparatus embodying the invention;

Fig. 2 is a front elevation of the cap feeding apparatus;

Fig. 3 is a fragmentary sectional view of the cap selector showing a properly presented cap;

Fig. 4 is a view similar to Fig. 3 but showing an improperly presented cap;

Fig. 5 is another fragmentary sectional view of the cap selector;

Fig. 6 is an inside view of the cap selector;

Fig. 7 is a top plan view, partly in section, of the cap feeding apparatus, the cap selector being in open position;

Fig. 8 is a detail sectional view of a latch for the cap selector;

Fig. 9 is a detail sectional view of the lower hinge mounting for the cap selector;

Fig. 10 is a detail view of a ratchet mechanism for the rotary cap selector;

Fig. 11 is a detail view of one of the driving members for the cap selector;

Fig. 12 is a detail view of another driving member;

Fig. 13 is a detail sectional view taken on the line 13—13 of Fig. 1;

Fig. 14 is a bottom view of the lower portion of the delivery chute;

Fig. 15 is a side view of the lower portion of the delivery chute;

Fig. 16 is a sectional view taken on the line 16—16 of Fig. 15;

Fig. 17 is a sectional view taken on the line 17—17 of Fig. 1, and

Fig. 18 is a detail view of a hopper gate or valve.

In these drawings, 39 designates an upright tubular standard which is supported on the base (not shown) of a bottle capping machine. A suitably driven rotary sleeve 41 fits about the tubular standard, and a suitably operated reciprocatory rod 61 is housed within the standard. A capping head support 68 is carried on the upper end of the standard and is vertically adjustable thereon by means including meshing bevel gears 77 and 78, the shaft for the latter gear having a crank handle 81. A capping head guide 74 is rotatably suspended from the stationary capping head support 68 and slidably fits at its lower end about the rotary sleeve 41 to which it is splined by a key 76 (Fig. 13).

The capping head guide 74 is provided with a circle of equally spaced vertical bores 83 slidably receiving the cylindrical portions of capping head bodies 84, the upper ends of which are provided with flat-topped arcuate segments 85, arranged as seen in Fig. 7. The edges of the segments 85 slidably rest on ledges 86 and 87 formed in the capping head support, the capping head bodies being inserted during assembly through an opening 90 in the upper portion of the capping head support (Fig. 7). The ledges 86 and 87 are interrupted so that the capping heads may be successively depressed at the capping position. The capping heads are retained against rotation about their axis in any suitable manner.

The upper end of the reciprocatory rod 61 projects above the bevel gear 77 and carries thereon a spring housing. The spring housing 91 slidably fits on vertical rods 96 upstanding from the capping head support to prevent rotation of the housing. A horizontal reinforcing plate 96' is secured to the upper ends of the rods 96.

A plunger 105 is yieldably connected to the spring housing 91 for vertical movement and is

slidably guided on the rods 96. The plunger carries a conical roller 109 engageable with the upper faces of the capping head body segments 85 to depress the capping heads on capping strokes. The plunger also carries a hook plate 101 engageable with the lower faces of the segments to lift the capping heads to their upper position.

Each capping head body 84 carries at its lower end a cup-shaped cap 113. A spring-pressed ejector plunger 114 is housed within the capping head body and projects from the lower end of the cap 113. A sector body 118 is secured about the cap 113 and retains therein a capping or crowning throat or die 122. The sector body 118 has formed thereon a conical bottle-centering skirt 127 which is open at the front to receive a bottle 134. Immediately below the capping throat 122, the sector body has a forwardly opening cavity adapted to receive a bottle cap or crown 129 which is supported at its flared edges. An inclined shelf or ledge 132 is formed on the sector body at the entrance of the cap-receiving cavity.

The capping head support 68 includes an extension 80 on which is secured, as by bolts 136, a superposed cap hopper 137. The cap hopper is provided with an inclined sheet metal bottom 138 and an inwardly spaced inclined perforated sheet metal bottom 138', as seen in Fig. 1, to permit foreign matter to sift through and enter a receptacle 139 formed at the lower end of the hopper, the receptacle being closed by a slidably mounted door 140. The bottoms 138 and 138' are secured to flanged portions of vertically extending front and rear wall members 141 and 141' respectively, the former of which is provided with a circular outwardly flaring opening 142 through which caps are discharged from the hopper. An outstanding circular rib 143 is integrally formed on the wall member 141 concentric with the opening 142 to rotatably receive therewithin a pair of disk-like cap selector plates 144 and 145, which are axially spaced at their outer portions. The plate 145 is provided with a hub 146 about which the plate 144 is secured, as by screws 147, the space between the plates being adjusted by interposed shims 147' surrounding the hub. The hub 146 has an inwardly projecting conical end and is carried on a shaft 148 which is journalled in anti-friction bearings 146' mounted in the hub 149 of a spider frame 150. The outer end of the shaft carries a hand wheel 148' to facilitate manual rotation of the selector. The spider frame has the outer end portions of two of its arms pivotally carried on vertically aligned axially spaced bushings 151 which pass through upper and lower lugs 153 formed on the hopper, thus permitting the cap selector to be swung outwardly from the hopper, as indicated in Fig. 7, for access to the selector and the interior of the hopper. Each bushing 151 is provided with an end flange 152 secured to the outer end face of the corresponding lug by a screw 154 as seen in Fig. 9. The spider frame is normally held in closed position by a spring pressed latch member 155 pivotally secured to the outer end of another arm of the frame and engageable with the front wall member 141, as seen in Fig. 8.

The cap selector plate 145 has a toothed ratchet ring 156 secured thereto for engagement with spring-pressed pawls 157 carried at the outer ends of rocker arms 158 and 158' journalled on the hub portion 149 of the spider frame. A reciprocatory rod 159 has a vertical portion passing slidably through the bushing 151. A pawl driver 300 is fastened to the vertical portion of the rod between the lugs 153, and has spaced cheeks 301 between which fits an apertured end lug 302 formed on a horizontally extending arm 160, the rod 159 passing loosely through the lug. The arm 160 is secured by bolts 303 to the spring housing 91 to reciprocate therewith. An arm 159' is formed at the upper end of the rod 159 and is pivotally connected to the rocker arm 158' by a link 304. The outer end of the rocker arm 158 is rounded to fit within cheeks 305 formed on the driver 300, and is provided with a pin 306 slidably received in a slot 307 formed in the driver. A cotter pin 308 is secured to the outer end of the pin 306. By means of the double-acting ratchet connections above described, the reciprocation of the capping rod 61 serves to rotate the cap selector.

The inner cap selector plate 144 is provided with a plurality of outwardly flaring openings 161 which register with the circular opening 142 in the hopper. At its peripheral portion the selector plate 144 is offset forwardly and is spaced from the similarly offset peripheral portion of the outer selector plate 145 to form an angular cap-receiving passage between them, as seen in Figs. 3, 4 and 5. A narrow annular shoulder 163 is formed on the offset portion of the selector plate 144 and is engageable with the flaring corrugated edge portions of an improperly presented cap, as indicated in Fig. 4, to prevent such cap from moving through the offset passage between the plates, and to prevent the cap from jamming in this position. During the rotation of the selector, such improperly presented cap will be lifted and will finally fall back into the hopper to be further agitated. A properly presented cap will not be stopped at the shoulder 163, since the rounded edges of the cap will ride over the flaring peripheral surface 163' of the selector plate 144, and thus permit the cap to pass to the periphery of the plates. To facilitate the movement of properly presented caps, the inner faces of the selector plates 144 and 145 are provided near the offset portions with respective rounded shallow grooves 164 and 164' concentric with the axis of the selector. An outwardly facing annular groove 309 is formed on the selector plate 145 at its inner face and near its periphery to receive the flanged edged portions of properly presented but undischarged caps so that such caps will remain at the periphery of the selector until they can be discharged, as indicated in Fig. 5. A circular series of inspection openings 310 are formed in the selector plate 145 near the offset portions of the plates. A number of agitator springs 311 are secured to the outer face of the selector plate 145 by screws 312 and clamping washers 313, and have bent free end portions passing through slots 314 formed in these plates.

The lower portion of the annular rib 143 is provided with a downwardly opening cap-discharging notch 165, which is closed at its front by a plate 165', and which registers with the upper end of a cap delivery chute 166. The chute is pivotally suspended on the lower portion of the cap hopper by a horizontal pin 167, and comprises a channel member having guide lips 180 secured to its flanges. An outwardly yielding spring-pressed gate 315 is mounted at the upper portion of the chute to permit the removal of defective or jammed caps. The chute includes a curved lower portion terminating in a lip 168 which rides on or is adjacent, the

ledges 132 of the sector bodies 118. The lip 168 is forked as seen in Fig. 14. A bracket 316 is saddled over the lower portion of the chute and has side cheeks 317 secured thereto by screws 318. A gate 169 has a forked portion 169' pivotally mounted on the bracket 316 and has a free end portion extending adjacent the sector body along a recessed edge of the lip 168 so as to form a side guide for the caps entering the sector bodies. The gate is normally urged to its closed position by a tensioned coiled spring 170. A cap which, for any reason fails to enter the revolving capping head will swing the gate open, as indicated by dotted lines in Fig. 13, thus preventing damage to the mechanism.

The cap chute 166 is held in its proper position with respect to the capping heads by a latch member 171 passing through an opening 172 formed in a bracket 173 secured to and depending from the capping head support 68. The latch member is interposed between cheeks or lugs 319 on the chute and is pivotally carried on a pin 320 passing transversely through the cheeks. The cheeks enter the opening 172 and are preferably tapered at their outer edges for centering them in the opening 172. Upon the lifting of the latch member 171, the cap chute may be swung outwardly from the capping heads about the pivot pin 167. A hook-shaped rod 321 is slidably mounted in the bracket 316 and has an end portion adapted to enter the cap chute to block the movement of caps, as seen in Fig. 16. The rod 321 is urged to unblocking position by a compressed coiled spring 322 surrounding the rod, and is retained in blocking position by a turn button 323 eccentrically mounted on the rod, the button having an offset projection 324 adapted to engage the outer face of the bracket 316.

The cap chute is provided with a cap rejector which includes deflectors 174 disposed at opposite side walls of the chute and engageable with the flanges of an improperly presented cap shunt the cap through an opening 175 in the chute and into a receptacle 176.

A vertical partition 325 is disposed in the cap hopper 137 in spaced parallel relation to the front wall of the hopper. The lower edge of the partition is spaced above the inclined bottom wall of the hopper to permit restricted passage of caps to the selector, thereby confining the caps to the lower portion of the selector so as to reduce axial pressure and friction on the selector and to minimize abrasion of the lacquered or lithographed caps. A valve disk 326 is pivotally secured by a bolt 327 to the forward face of the partition 325 and has a notch 328 in its periphery to expose the cap passage below the partition. A handle 329 on the disk permits the valve to be turned to open or closed position. When the valve disk is in closed position the selector can be swung open without excessive discharge of caps.

Horizontally extending filler bars 330 are interposed between the upper edge portions of the spaced outer and inner sheet metal bottom members 138 and 138'. At each side the outer bottom member 138 has an inturned hooked upper edge 331 embracing the adjacent filler bar and the upper edge of the inner bottom member and secured thereto by bolts or rivets 332.

In operation, a series of bottles 134 are fed in any suitable manner below the revoluble capping heads, and the capping rod 61 is reciprocated a number of times for each revolution of the capping head, corresponding to the number of capping heads. When a capping head approaches the capping position, the capping rod 61 moves downwardly, carrying with it the spring housing 91 and the subjacent capping head. A bottle cap has been previously deposited through the cap chute into the capping head in readiness for the capping operation, and upon the downward movement of the capping head, the cap is applied to the bottle by the ejector plunger 114 and capping throat 122. As the capping head rises, the ejector plunger forces the capped bottle out of the capping throat. The capping head is lifted to its upper position by the hook member 101 on the plunger 105.

The capped bottle is discharged from the capping mechanism, and as the capping head revolves, it receives another cap from the cap chute 166. The cycle of operation is then repeated. During the revolution of the capping heads, the discharge end of the cap chute intermittently registers with the cap-receiving cavities of the capping heads and at all other times the lower end of the cap chute is blocked by the curved outer faces of the capping head sector bodies 118.

The capping rod 61 reciprocates the selector operating rod 159 and driver 300 through the arm 160 secured to the spring housing 91. On the downward movement of the rods 61 and 159, the ratchet ring 156 is rotated by the pawl on the rocker arm 158' through the link 304, and on the upward movement of the rods, the ratchet ring is rotated by the pawl on the rocker arm 158 through the driver 300. As the selector rotates, the caps find their way into the space between the selector plates 144 and 145, as hereinbefore described, and properly presented caps are discharged through the notch 165 and into the cap chute 166 from which they are fed into the capping heads.

When access to the hopper or arm face of the selector is desired, the selector is swung open about its hinge mounting after releasing the latch 155 and after closing the valve hopper. It is unnecessary to disturb or disconnect the operating means for the selector when opening the selector.

What I claim as new and desire to secure by Letters Patent is:

1. In a container closing machine, a crown hopper having a wall provided with a discharge opening, a rotary crown selector in register with said opening for controlling the passage of crowns therefrom, a frame on which said crown selector is rotatably mounted, means for pivotally mounting said frame on said hopper to swing about a substantially vertical axis, and reciprocatory means for rotating said selector including a portion arranged substantially axially of the pivotal mounting of said frame.

2. In a container closing machine, a crown hopper having a wall provided with a discharge opening, a rotary crown selector in register with said opening for controlling the passage of crowns therefrom, a frame on which said crown selector is rotatably mounted, means for pivotally mounting said frame on said hopper to swing about a substantially vertical axis, and a pawl and ratchet connection for rotating said selector including a reciprocatory rod extending substantially axially of the pivotal mounting of said frame.

3. In a container closing machine, a revoluble capping head, a reciprocatory member for operating said capping head, a stationary crown hopper, a stationary crown chute for transferring crowns from said hopper to said revoluble capping head, a rotary crown selector for said crown

hopper, and actuating means for said crown selector operatively connected with said reciprocatory member.

4. Cap-feeding apparatus comprising a cap receptacle having a discharge opening, a rotary cap-feeding member in register with said opening, supporting means for said cap-feeding member pivotally mounted on said receptacle, and driving means for said cap-feeding member including a portion arranged substantially axially of the pivotal mounting of said supporting means.

5. Cap-feeding apparatus, comprising a cap receptacle having a discharge opening, a rotary cap-feeding member in register with said opening, a supporting member for said cap-feeding member, means for pivotally mounting said supporting member on said receptacle and including a tubular member arranged along the pivotal axis, and driving means for said cap-feeding member including a portion passing through said tubular member.

6. Cap-feeding apparatus comprising a cap receptacle having a discharge opening, a rotary cap-feeding member in register with said opening, a supporting member for said cap-feeding member, means for pivotally mounting said supporting member on said receptacle and including a tubular portion arranged along the pivotal axis, and a reciprocatory driving rod passing through said tubular portion and having a ratchet connection with said cap-feeding member.

7. Cap-feeding apparatus comprising a cap receptacle having a discharge opening, supporting means, and a rotary cap feeder mounted on said supporting means in register with said opening, said receptacle having portions surrounding the periphery of said cap feeder and provided with a cap-delivery aperture, said cap feeder including spaced wall members forming a cap passage between openings at the periphery of the feeder to discharge caps by gravity into said aperture, one of said wall members having an annular shoulder supporting caps at the periphery of the feeder in readiness for delivery to said aperture.

8. Cap-feeding apparatus comprising a supporting means, a cap chute pivotally suspended from said supporting means and having a lug portion, a bracket secured to said supporting means and having an aperture adapted to receive said lug portion, and a latch member pivotally mounted on said lug portion and engageable with said bracket for releasably retaining said chute in normal position.

9. Cap-feeding apparatus comprising a cap receptacle having a curved bottom wall along which caps descend and having a partition spaced above said wall, cap-feeding means receiving the caps descending along said bottom wall, and a valve plate pivotally mounted on said partition to swing about an axis substantially normal to the plate and having an edge with a curved portion adapted to lie adjacent said curved bottom wall to stop the movement of caps to said feeding means, another portion of said edge being spaced from said bottom wall to permit the movement of caps to the feeding means.

10. Cap-feeding apparatus comprising a chute having a cap passage, a bracket secured to said chute and having spaced cheeks at opposite sides of said chute and provided with aligned bores extending transversely of the chute, said chute having a side opening communicating with said cap passage, a stop member having a shank portion slidably mounted in said bracket bores and having a reversely turned end portion passing through said chute opening to enter said cap passage in cap-blocking relation, said stop member being movable in alternative cap-blocking and free positions, spring means on said shank portion and between said cheeks for urging said stop member to one of its positions, and means for releasably retaining said stop member in its other position.

11. In a container closing machine, a hopper comprising spaced end wall members one of which has a discharge opening, an inner sheet metal member rigidly connecting said end wall members and forming a bottom wall sloping toward said opening, said bottom wall being perforated to pass foreign matter therethrough, and an outer sheet metal member rigidly connecting said end wall members and forming a sloping bottom, at least one of said sheet metal members being of channel shape to form the opposite side walls of the hopper.

12. In a container closing machine, a hopper comprising spaced wall members one of which has a discharge opening and each of which has an inturned flange, and a pair of spaced inner and outer channel-shaped sheet metal members rigidly connecting said wall members and secured respectively to the inner and outer faces of said flanges, said sheet metal members forming opposite side walls and a sloping bottom of said hopper, and the inner sheet metal member being perforated to pass foreign matter to the outer sheet metal member.

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