

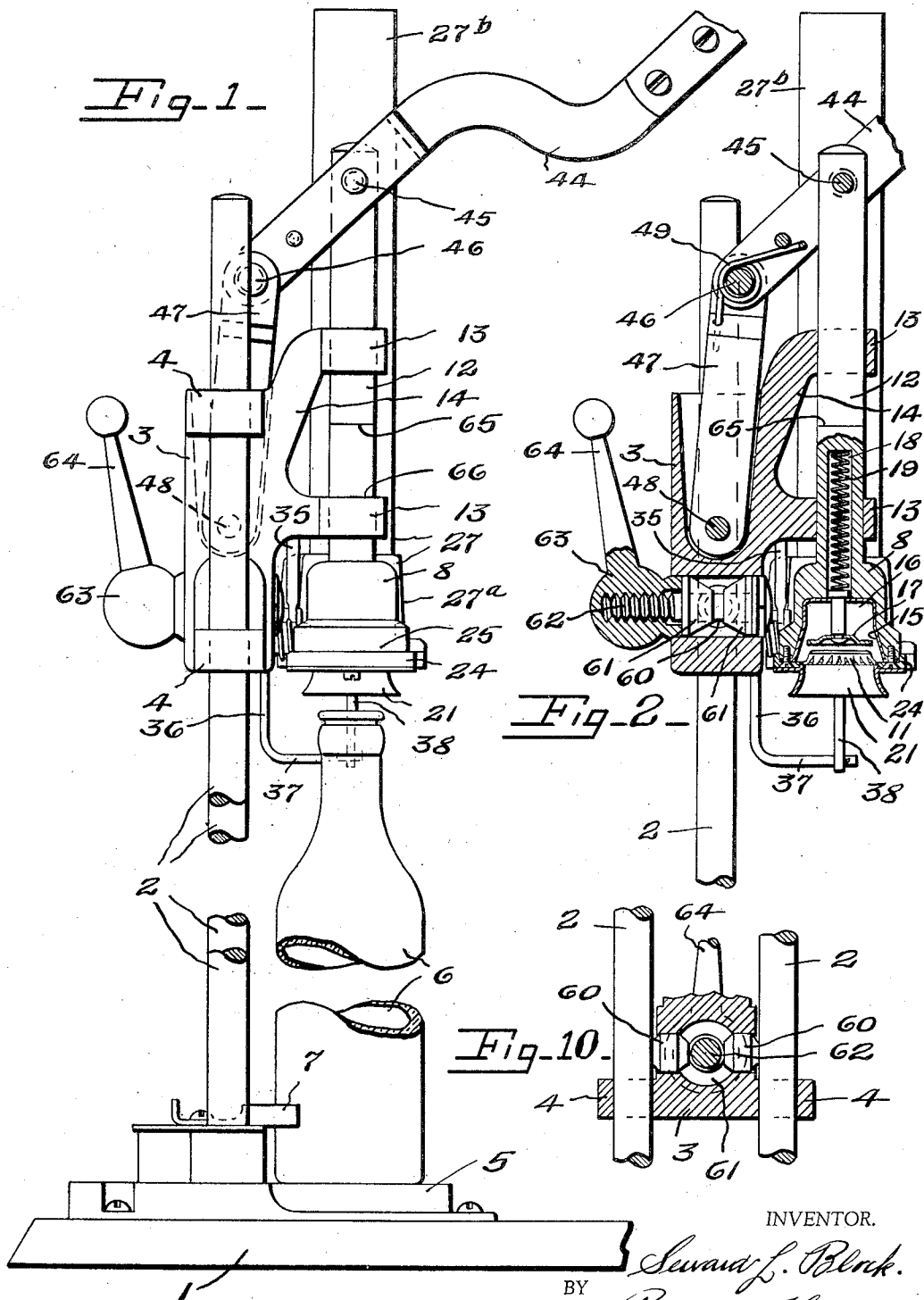
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S. L. BLOCK

2,023,401

BOTTLE CAPPING MACHINE

Original Filed Nov. 18, 1932 3 Sheets-Sheet 1



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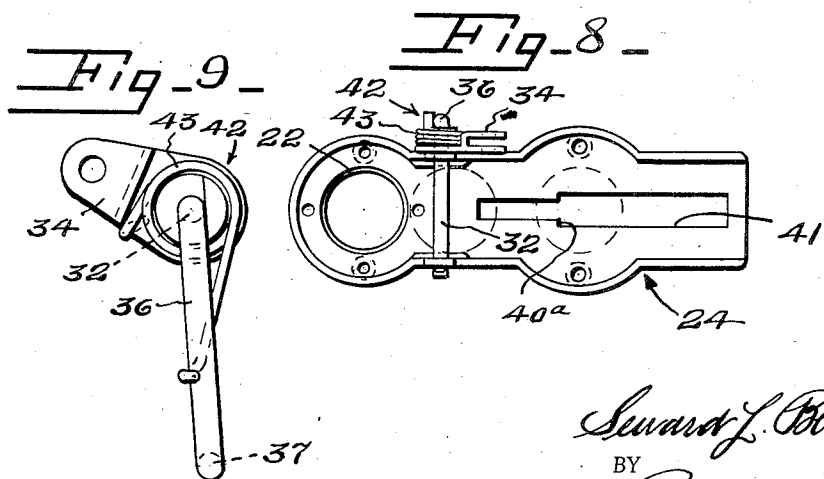
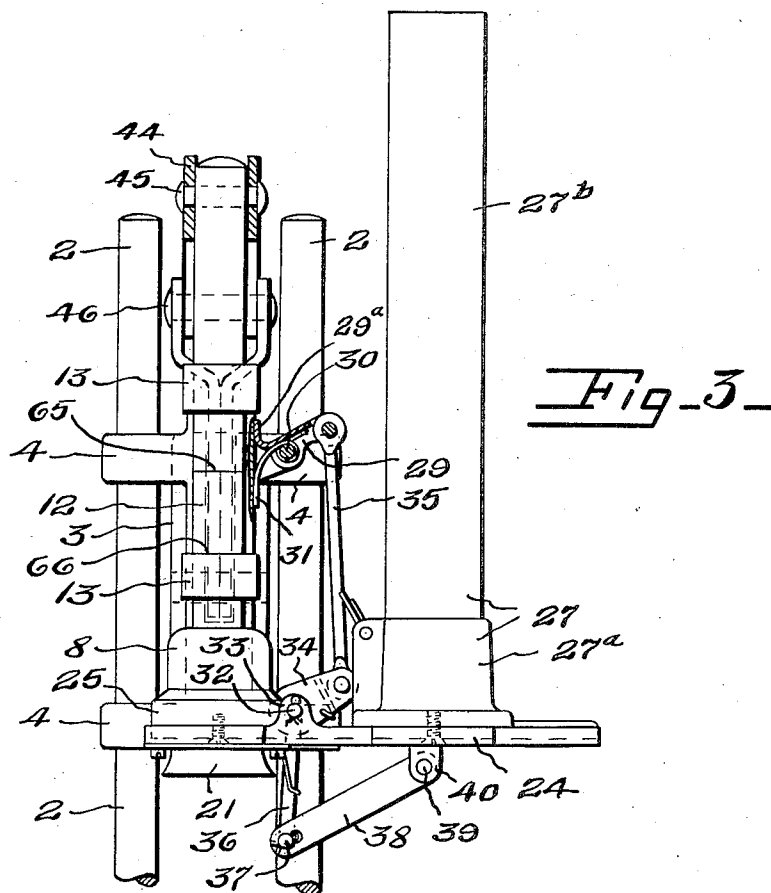
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BOTTLE CAPPING MACHINE

Original Filed Nov. 18, 1932 3 Sheets-Sheet 2



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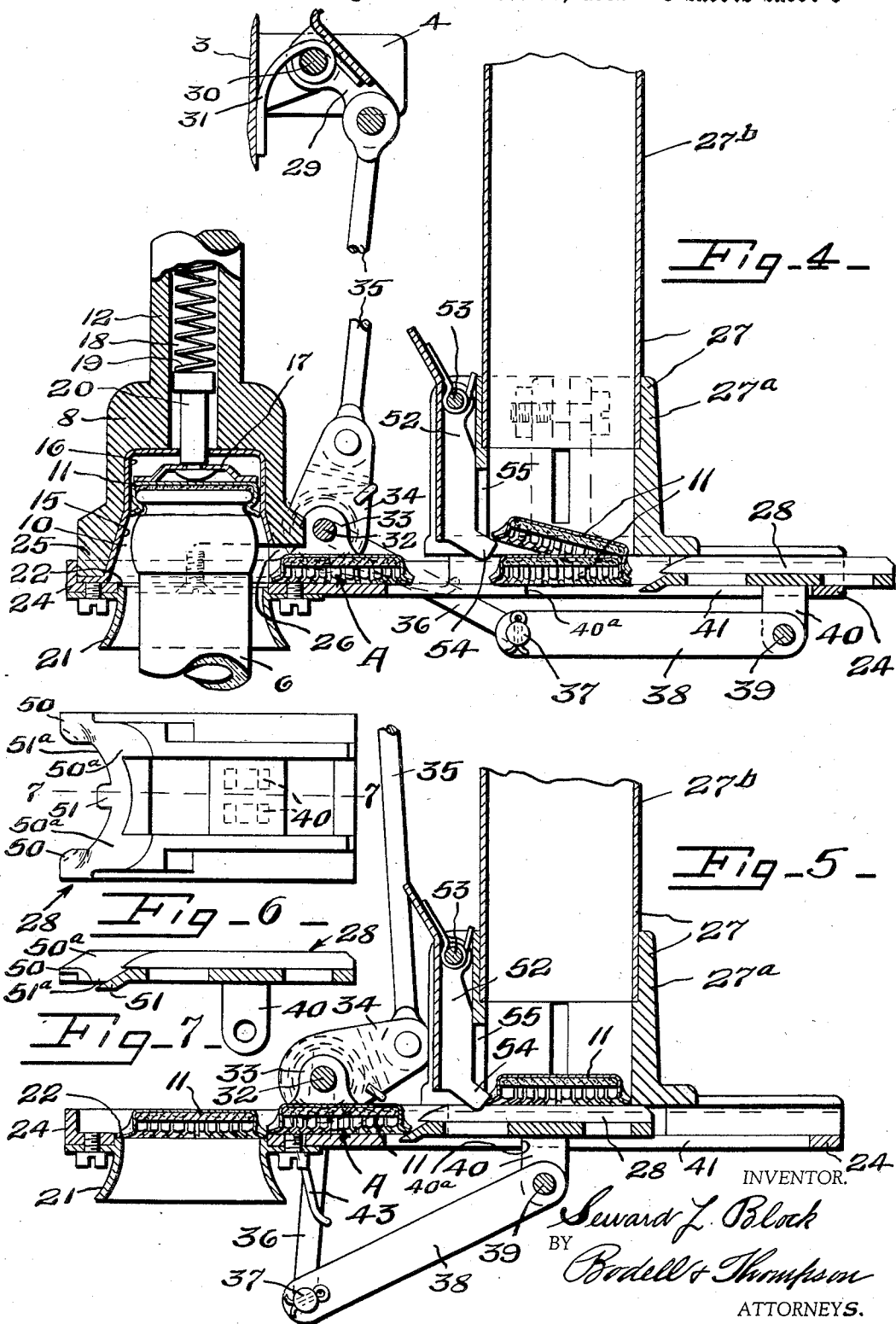
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BOTTLE CAPPING MACHINE

Original Filed Nov. 18, 1932 3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,023,401

BOTTLE CAPPING MACHINE

Seward L. Block, Syracuse, N. Y.

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9 Claims. (Cl. 226—84)

This invention relates to bottle capping machines, and has for its object, a machine which is particularly simple in construction, fast in operation, and highly efficient in use.

5 It further has for its object a die construction having a clearance recess into which the upper end of the bottle, with the cap applied thereto, passes for the purpose of permitting sufficient relative movement of the cap applying die head and the bottle to effect the automatic feeding
10 of the bottle caps from a magazine into position to be applied to the bottle.

It further has for its object, a particularly simple and efficient magazine, or feeding mechanism, operable during the operation of the die,
15 or head, when applying the bottle cap, and when moving back after applying the bottle cap to its starting position, and embodying a spring pressed lost motion connection, or connections, by which
20 the head may continue its movement relatively to the feeding mechanism when the feeding of the caps is limited, and also the feeding mechanism continues to operate to feed the cap into operative relation to the die for the bottle after the die
25 head has completed its movement, or returned to its starting position, and also connections for operating the feeding mechanism, whereby breakage of the connections, or other parts, is prevented in case of undue obstruction in the
30 operation of the feeding mechanism.

It further has for its object, an escapement, or dispensing, or cut-off mechanism, operated by the feeding mechanism whereby the feeding of the caps, one by one, from the magazine is positively insured.

Other objects appear throughout the specification.

The invention consists in the novel features and in the combinations and constructions herein-
40 after set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

45 Figure 1 is a side elevation, partly broken away, of a bottle capping machine embodying my invention, a bottle being also shown.

Figure 2 is a fragmentary, sectional view through the carriage and the die, the carriage,
50 the die, and the bottle cap support.

Figure 3 is a fragmentary elevation, partly in section, looking to the left of the upper portion of Figure 1, the feeding mechanism being shown as in its starting position.

55 Figure 4 is an enlarged, fragmentary, sectional

view of parts seen in Figure 3, the cap feeding mechanism being shown in half-way operated position.

Figure 5 is a view, similar to Figure 4, parts being omitted, the cap feeding mechanism being
5 shown in its starting position.

Figure 6 is a plan view of the slide of the feeding mechanism.

Figure 7 is a sectional view on line 7—7, Figure 6.

Figure 8 is a plan view, on a reduced scale, of the guide of the feeding mechanism and the bottle cap support.

Figure 9 is a detail view of one of the joints in the motion transmitting connections which oper-
15 ate the slide of the feeding mechanism.

Figure 10 is a fragmentary, sectional view showing the clamping means for clamping the carriage for the die head in its adjusted position
20 along the guide rods.

The frame of the machine includes a suitable supporting base 1 having an upwardly extending guide 2, and a carriage 3 adjustable along the guide, the guide 2 being here shown as a pair of spaced apart upright rods, and the car-
25 riage as having bearings or eyes 4 slidable on the rods. The base 1 is also provided with a suitable rest 5 for the bottle 6, and means as an adjustable arcuate clip 7 for centering the bottle.

8 is a vertically reciprocable head mounted in
30 the carriage 3 and having a die cavity 10 at its lower end for cooperating with the caps 11 to secure, or crimp them, on the bottle. The caps are the well known type which are discoidal in general form with a down-turned, or crimped,
35 margin which is contracted by the die into engagement with the upper end of the bottle neck. The head 8 is here shown as formed with an upwardly extending stem 12 movable through guide bearings 13 provided in overhanging brackets 14
40 on the carriage 3.

The die cavity is provided with a die portion 15 at its lower end, or mouth, and with a cylindrical clearance recess 16 of considerable extent for a purpose to be hereinafter explained. Also, a
45 spring pressed pressure foot 17 is provided in the die cavity for engaging the cap 11 in advance of the die, and holding the cap from shifting on the bottle until the die comes into coaction with the cap, and also to guide the cap to the cap seat
50 and prevent it from flopping while being fed to the cap seat.

As here illustrated, the stem 12 is formed with an axial bore 18 in which a compression spring 19 is located, the spring pressing against the end
55

of the stem 20 of the foot 17, which stem slides in the bore 18. As here illustrated, the die cavity is shown as provided with a lining of hard material because the head is formed of a die metal for quantity manufacture, but the head 8 could be formed of hard metal, and the lining dispensed with.

21 is a guide for the neck of the bottle 6, and this is provided with a cap seat 22 at its upper end. As here shown, the guide 21 is carried by the head 8 in advance of the die cavity 15, and is secured to one end of a guide or plate 24 forming part of the cap feeding mechanism, and this guide or plate 24 is secured to a downward extension 25 of the head 8. The cap seat is in the form of an annular groove, or countersink around the upper end of the bottle neck guide 21, and is of a little larger diameter than the caps. It is arranged coaxially with the die cavity. Being a groove, or countersink, it receives and centers the caps relatively to the bottle necks, or the bottle neck guide 21. The guide 21 is flaring, or in the form of an inverted funnel in order to center the bottles, if not accurately centered when the head is moved downwardly. The cap seat 22 is thus spaced apart from the advance end of the die cavity. The head is open at one side, or provided with a gate at 26, in order that the caps may be fed along the guide 24 onto the seat 22.

The feeding mechanism for the caps includes the plate or guide 24 which is, as before described, carried by and movable with the head 8, a magazine 27 mounted on the plate 24, a cut-off slide or plunger 28 movable along the guide 24 across the lower end of the magazine 27, and motion transmitting means operable by the reciprocating movement of the head 8 to operate the slide, this motion transmitting means including one or more lost motion joints, the last motion of which is yieldingly restrained by springs.

As here illustrated, this motion transmitting mechanism includes a rock arm 29 pivotally connected at 30 to the carriage 3, and being acted upon by a spring 31 which resists the pivotal movement, a rock shaft 32 mounted in suitable lugs 33 on the upper side of the guide, or plate 24, and having a rock arm 34 thereon, a link 35 connecting the rock arms 29 and 34, a rock arm 35 mounted on the rock shaft 32 and extending below the guide or plate 24, and having a laterally extending crank 37 at its lower end, and a link 38 connecting the crank 37 at 39 to a depending lug 40 on the slide 28, the lug depending through a slot 41 in the plate or guide 24. The upward movement of the rock arm 29 is limited by a shoulder or tail 29^a which engages the part to which the arm is pivoted.

As seen in Figure 9, the rock arm 34 is connected to the shaft 32 through a lost motion spring pressed joint 42 which permits movement of the rock arm relatively to the shaft 32 when the slide is held from movement, the spring 43 being strong enough to transmit movement to the slide when the slide is free to move, and relative movement of the rock arm 34 to the shaft 32 tensions the spring so that its reaction will tend to move the slide in the opposite direction. This spring 43 permits continued downward movement of the head when the slide is held from movement. The continued movement takes place when the die is crimping the cap on the bottle, at which time the feeding of the caps is obstructed or prevented. The forward movement of the slide 28, or its starting position, is determined by a shoulder 40^a

coacting with the lug 40 and located at the forward, or left hand end, Figures 5 and 8 of the slot 41 through which the lug depends.

The head 8 is actuated in any suitable manner, as by a lever 44 pivoted at 45 to the stem 12 of the die head, and fulcrumed, or pivoted, at 46 to the upper end of the link 47, the lower end of which is pivoted at 48 to the carriage 3, the lever 44 acting against the returning spring 49, Figure 2, this being located at the joint 46 between the lever 44 and the link 47. During downward movement of the head 8 by the lever 44, assuming that a cap is in place on the cap seat 22, the spring pressed foot 17 first engages the cap and holds it on the upper end of the bottle. Thereafter, the die portion 15 crimps the cap on the bottle, and during further movement, the clearance recess 16 passes further down over the bottle cap and upper end of the bottle. During such downward movement of the head, the slide 28 is first actuated, to the right, from the position shown in Figure 5, to that shown in Figure 4, due to the fact that the lever 29 is mounted on a fixed point relative to the movement of the head, and is held from pivotal movement by the spring 31, so that the rock arm 34 moves from the position shown in Figure 5 to that shown in Figure 4. When the slide 28 reaches its extreme right hand position, as shown in Figure 4, a bottle cap drops, or is fed, from the magazine onto the plate or guide 24 in front of the slide, an escapement mechanism, to be hereinafter described, being provided to prevent more than one cap feeding out of the magazine. During the return, or upward movement of the head 8, the rock arm 34 is moved from its position shown in Figure 4 to that shown in Figure 5, so that the slide pushes the bottle cap out of the magazine, this thrusting against one, at A, that has been previously pushed out, pushing the latter through the gate 26 onto the cap seat 22 for the next capping operation.

The spring acting on the rock arm 34 permits the connections to move at any time the slide 28 is held from movement, and the spring 34 permits the arm 29, which is normally rigid, to yield and prevent breakage, or straining, of parts of the connections at any time either the head 8, or the slide 28, may be obstructed in its movement, and the carriage 3 continues to move. The spring 31, as before stated, permits the arm 29 to yield during downward movement of the head when the movement of the caps along the guide 24, or the movement of the slide, is obstructed.

The slide 28 is provided with under-cut shoulders 50 at its advance end and on opposite sides of its lengthwise median line, for pushing against the edge of the cap in the guide, or plate 24, that is, the lowermost cap, and with wedge surfaces 53^a in the rear of said shoulders for also pushing upwardly the second from the last cap in the magazine in order to cut off the second from the last cap from feeding downwardly. It is also provided with a shoulder, or prong, 51 located midway between the shoulders 50 for extending under the lowermost cap and for preventing tilting of the lowermost cap which is being slid along the guide 24. The shoulders 50 and wedges 53^a are located at the opposite extremities of an arcuate notch 51^a at the advance end of the slide, and the prong 51 midway between the shoulders 50 in the middle of the arc.

The escapement mechanism comprises a spring pressed latch 52, see Figure 4, extending vertically along the lower end of the magazine 27, and pivoted at 53 at its upper end and having 75

its lower end provided with a nose 54 extending through a slot 55 in the lower end of the magazine 27, and normally arranged in the path of the next to the last cap in the magazine, as shown in Figure 4. This nose also projects into the path of the advance edge of the lowermost cap to be fed along the guide 24 out of the magazine.

The advance edges of the shoulders 50 are knife edges to insure cutting off of the next to the last cap in the magazine when tilted as seen in Figure 4.

When all parts are in starting position, the latch 52 is in the position shown in Figure 5 wherein the end of the nose presses against the edge of the now lowermost cap in the magazine resting on the slide 28, which is in its starting position, wherein it closes, or cuts off, the lower end of the magazine. During the downward movement of the head 8, as before described, the slide 28 is moved from its position shown in Figure 5 to that shown in Figure 4, letting the caps in the magazine feed downward, and one of them feeds into the guide, or plate 24 in front of the slide. During this movement, the latch 52 is pressed by its spring into the position shown in Figure 4. During the upward movement of the head, as before described, the slide 28 moves to the left, Figure 4, the shoulders 50 thrusting against the cap in the guide 24, and the cam surfaces 50^a wedging under the next to the last cap in the guide, forcing its adjacent edge upward, so that the slide passes under this cap, or cuts off the magazine. During this movement, the cap, that has been dropped into the guide, is fed against the cap previously fed, and this in turn moved onto the cap seat 22. The extreme edge of the downturned margin of the cap is hooked under the knife edges. Hence, tilting upward of the cap being fed is prevented. The prong 51 prevents downward tilting.

In operation, the carriage 3 is adjusted along the guide rods 2 to the proper height for the bottles to be capped, and it is held in adjusted position by means operable to clamp it to the rods 2. This means includes laterally extending clamping members 60 mounted in the carriage 3 to slide laterally in opposite directions against opposing sides of the rods 2, a pair of conical wedges 61, one of which is axially shiftable on a stud 62 toward and from the other, these wedges coacting with the slides, or clamping members 60 and a nut 63 threading on the stud against one of the wedges. This nut is provided with a suitable handle 64. Upon loosening of the nut, the wedges will tend to separate thus relieving the clamping force on the clamping members 60, so that the carriage can be slid along the rod. When the carriage has reached its adjusted position, the nut 63 is tightened, thus moving one of the conical wedges 61 toward the other, and thrusting the clamping members 60 outward into snug engagement with the rods 2.

Bottles vary in height. In order to determine the proper adjustment of the carriage 3 for any particular batch of bottles, the carriage is adjusted until the gage mark 65 on the stem 12 is in line with the upper edge 66 of the lower one of the eyes 13 when the handle has been moved downwardly to merely bring the die 15 against the upper end of the bottle. Then, the nut 63 is tightened so that further movement will move the line 65 below the line 66 during the crimping operation of the cap.

The magazine 27 includes a base portion 27^a,

and a tubular portion 27^b which is removable for the purpose of inserting a new batch of caps, the tubular portion 27^b merely telescoping into the base portion 27^a.

This bottle capping machine is particularly advantageous in that, owing to the feeding mechanism, the feeding is positive and is not upset by obstructions, or inaccurate timing of the movement of the head relatively to the slide 28, and slight variations in the heights of bottles supposed to be of exactly the same height, and is further advantageous in that the caps are fed uniformly, can not be displaced during the feeding movement, and are accurately aligned with the bottle and with the die, owing to the cap seat 22. It is further advantageous in that the cut-off and escapement mechanism is extremely simple coacting with diametrically opposite edges only of the cap without the use of a cut-off plate, other than the slide 28.

What I claim is:

1. In a bottle capping machine, a frame, a vertically reciprocable head having a die cavity, a cap support having an entrance for the neck of a bottle to be capped, and a cap seat countersunk relative to said passage, said support being spaced from the head below the die cavity and movable with the head, means carried by the frame and connected to the head to reciprocate the same, said die cavity having a die portion at its end nearest the cap seat, and a clearance recess for the cap, when attached to the bottle, in the rear of the mouth to permit the die portion to pass the cap and around the neck of the bottle after the cap is secured to the bottle, a magazine for the caps, and means for feeding the caps from the magazine during the withdrawal movement of the head, and to move into position to feed the caps from the magazine while the clearance recess is moving over the cap on the bottle, and a spring pressed foot carried by the head in the die cavity and extending into the die cavity and arranged to engage the cap in advance of the die.

2. In a bottle capping machine, a frame, a vertical reciprocable head having a die cavity, a cap support provided with a cap seat spaced from the head below the die cavity, the cap support being movable with the head, said die cavity having a die portion at its advance end, and a clearance recess for the cap, when the cap is attached on the bottle, the recess being in the rear of the die portion to permit the die portion to pass the cap and encircle the bottle neck, a cap magazine and carrier therefor, the carrier and the magazine being movable with the head, the carrier being provided with a guide for the caps aligned with the space between the head and the cap seat, means connected to the frame and to the head to reciprocate the same, a slide movable along the magazine support in the guide for feeding the caps from the magazine along the guide to the cap seat, and motion transmitting connections between the frame and the slide and operable to move the slide in a retrograde direction during the downward movement of the head, for locating the slide in position, to feed a cap from the magazine, during the movement of said clearance recess over the cap and the movement of the die portion around the bottle neck, and moving the slide in the opposite direction to feed the caps along the guide, and one of them onto the cap seat during upward movement of the head, said motion transmitting connections including a joint having a lost motion, and a spring tending to take up the lost motion.

3. In a bottle capping machine, a frame, a vertical reciprocable head having a die cavity, a cap support provided with a cap seat spaced from the entrance of the die cavity, the cap support
 5 being movable with the head, a magazine for the caps, and a carrier therefor, the latter being movable with the head, the carrier being provided with a guide for the caps, said guide being in line with the space between the head and the
 10 cap supporting surface, a slide movable along the guide for feeding the caps one by one from the magazine to the cap seat, means connected to the frame and to the head for reciprocating the head, and motion transmitting connections be-
 15 tween the frame and the slide for moving the same in one direction along the guide during downward movement of the head, and in the opposite direction during upward movement of the head, said connections including spring pressed, lost motion,
 20 joint means operable to permit movement of the head relatively to the slide when the movement of the slide is stopped.

4. In a bottle capping machine, a frame, a vertical reciprocable head having a die cavity, a
 25 cap support provided with a cap seat spaced from the entrance of the die cavity, the cap support being movable with the head, a magazine for the caps, and carrier therefor, the latter being movable with the head, the carrier being provided
 30 with a guide for the caps, said guide being in line with the space between the head and the cap supporting surface, a slide movable along the guide for feeding the caps one by one from the magazine to the cap seat, means connected to the
 35 frame and to the head for reciprocating the head, and motion transmitting connections between the frame and the slide for moving the same in one direction along the guide during downward movement of the head, and in the opposite direction
 40 during upward movement of the head, said connections including a rock arm pivoted to the frame and a spring resisting pivotal movement in one direction, a second rock arm pivotally mounted on the carrier, a link connecting the
 45 rock arms, a motion transmitting member, means connecting it to the slide, and means connecting said member to the second rock arm including a lost motion spring pressed joint operating to permit movement of the second rock arm against
 50 its spring relative to said member.

5. In a bottle capping machine, a frame, a reciprocal head having a die cavity, a cap support provided with a cap seat spaced from the head, a
 55 magazine for the caps, and means for feeding the caps one by one from the magazine to the cap seat during the reciprocations of the head, said means including a guide for the caps leading from the magazine to the cap seat, a cut-off
 60 slide movable along the guide across the end of the magazine, a spring pressed latch normally holding one edge of the second cap from the exit end of the magazine out of the path of the slide, and having a surface arranged in the path of
 65 the lowermost cap in the magazine, whereby the latch is moved out of its operative position to permit the second from the last cap to fall onto the slide during the feeding and cutting off movement of the slide.

6. In a bottle capping machine, a frame, a reciprocal head having a die cavity, a cap support provided with a cap seat spaced from the head, a magazine for the caps, and means for
 70 feeding the caps one by one from the magazine to the cap supporting surface during the reciprocations of the head, said means including a guide

for the caps leading from the magazine to the cap supporting surface, a slide movable along the guide across the end of the magazine, a spring pressed latch normally holding one edge of the
 5 second cap from the exit end of the magazine out of the path of the slide, and having a surface arranged in the path of the lowermost cap in the magazine, whereby the latch is moved out of its operative position to permit the second from
 10 the last cap to fall onto the slide during the feeding and cutting off movement of the slide, the slide having a shoulder at its advance edge for engaging the cap to be fed out of the magazine, and a cam in the rear of the shoulder for wedging under the adjacent edge of the second
 15 cap, said latch and cam coacting with the opposite edge portion of the second cap.

7. In a bottle capping machine, a frame, a reciprocal head having a die cavity, a cap support provided with a cap seat spaced from the head, 20
 a magazine for the caps, and means for feeding the caps one by one from the magazine to the cap supporting surface during the reciprocations of the head, said means including a guide for the caps leading from the magazine to the cap sup- 25
 porting surface, a slide movable along the guide across the end of the magazine, a spring pressed latch normally holding one edge of the second cap from the exit end of the magazine out of the path of the slide, and having a surface ar- 30
 ranged in the path of the lowermost cap in the magazine, whereby the latch is moved out of its operative position to permit the second from the last cap to fall onto the slide during the feeding and cutting off movement of the slide, the slide 35
 having a shoulder at its advance edge for engaging the cap to be fed out of the magazine, and a cam in the rear of the shoulder for wedging under the adjacent edge of the second cap, the slide having shoulders at its advance end on 40
 opposite sides of its lengthwise median line for thrusting against the edge of the lowermost cap on the side then opposite that engaged by the latch, and wedge surfaces extending rearward for wedging under the second from the lowermost 45
 cap in the magazine.

8. In a bottle capping machine, a frame, a reciprocal head having a die cavity, a cap support provided with a cap seat spaced from the head, a magazine for the caps, and means for
 50 feeding the caps one by one from the magazine to the cap supporting surface during the reciprocations of the head, said means including a guide for the caps leading from the magazine to the cap supporting surface, a slide movable along the 55
 guide across the end of the magazine, a spring pressed latch normally holding one edge of the second cap from the exit end of the magazine out of the path of the slide, and having a surface arranged in the path of the lowermost cap in the magazine, whereby the latch is moved out of its operative position to permit the second from the last cap to fall onto the slide during the feeding and cutting off movement of the slide, the slide having a shoulder at its advance edge 65
 for engaging the cap to be fed out of the magazine, and a cam in the rear of the shoulder for wedging under the adjacent edge of the second cap, the slide having shoulders at its advance end on opposite sides of its lengthwise median line for thrusting against the edge of the lowermost cap on the side then opposite that engaged by the latch, and wedge surfaces extending rearward for wedging under the second from the low- 70
 ermost cap in the magazine, and also having a 75

shoulder at its advance end extending under the margin of the lowermost cap.

9. In a bottle capping machine, bottle capping mechanism, and a support, a frame therefor including a guide, a carriage shiftable along the guide, a feed mechanism including a head supported by the carriage and having a die cavity, a cap support carried by the head, and operating means connected to the carriage and the head, and means for holding the carriage in its

adjusted position, the frame including a pair of spaced apart rods, and the carriage being movable along the rods, and feed means for holding the carriage in its adjusted position comprising clamping members movably mounted in the carriage and coacting with opposing faces of the rods, wedge means coacting with the clamping members to force the same outwardly, and screw means for operating the wedge means.

SEWARD L. BLOCK. 10