

No. 860,787.

PATENTED JULY 23, 1907.

H. S. BREWINGTON.
BOTTLE CAPPING MACHINE.

APPLICATION FILED AUG. 9, 1906.

6 SHEETS—SHEET 1.

Fig. 1.

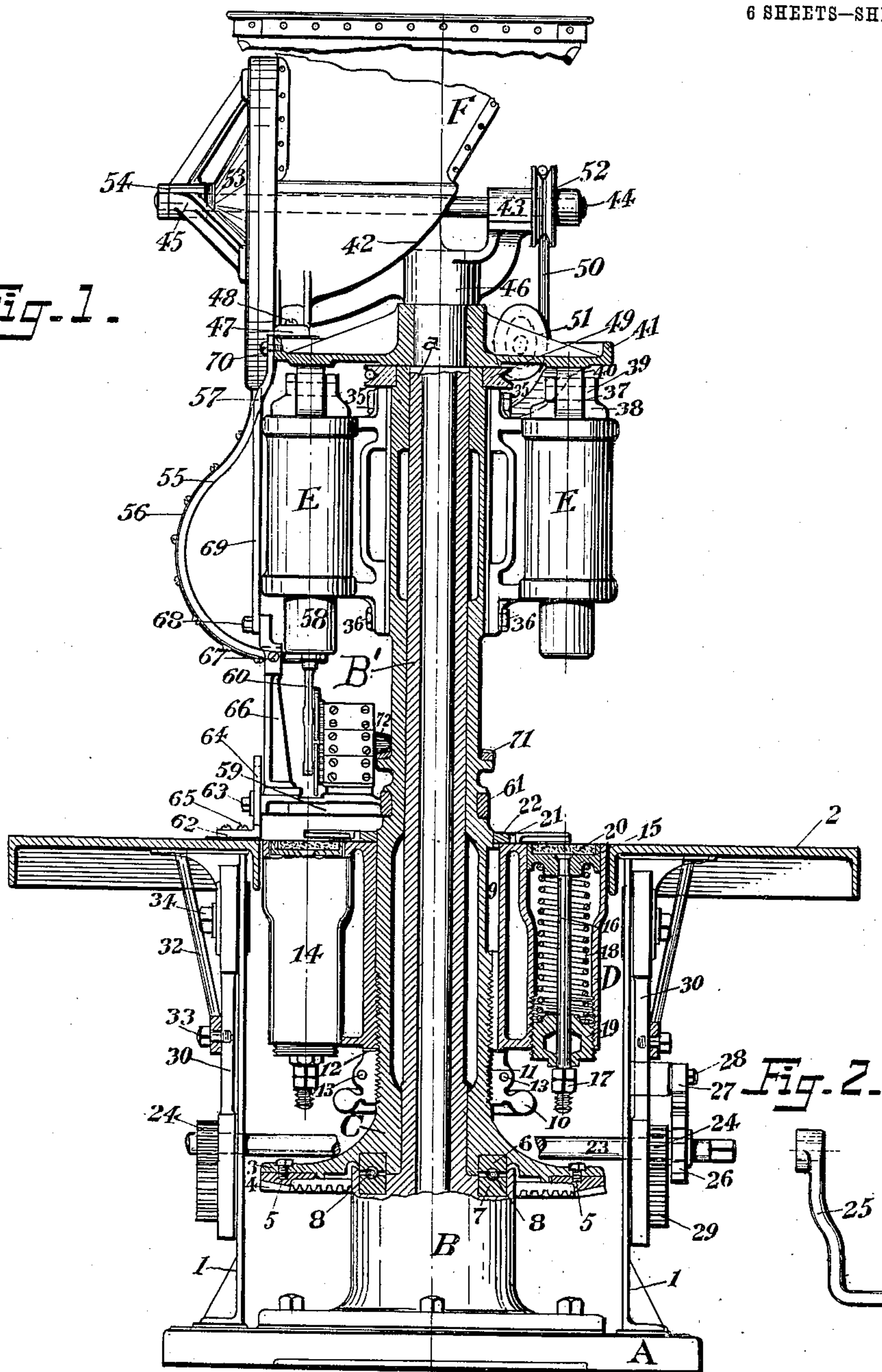


Fig. 2.

Witnesses

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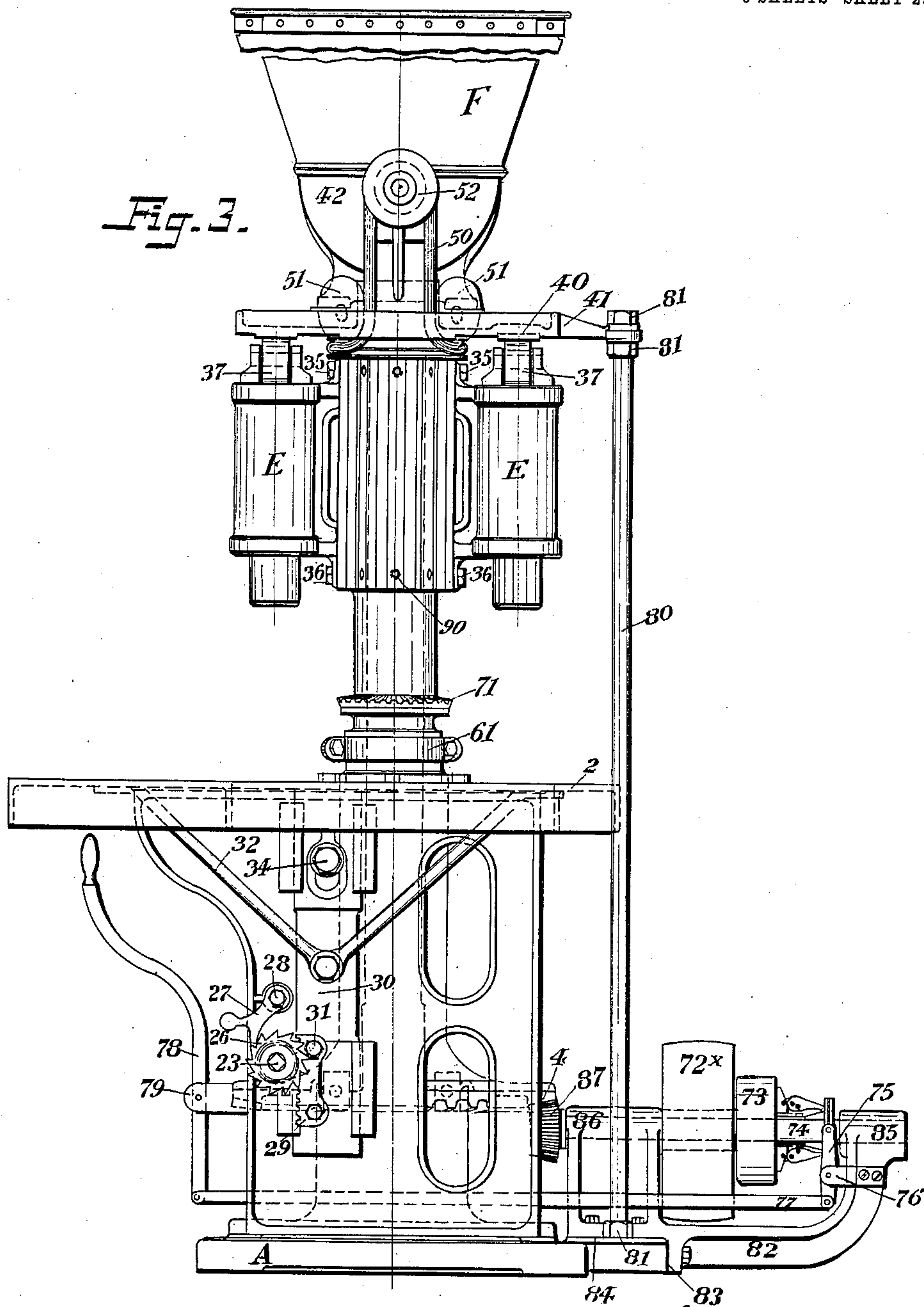
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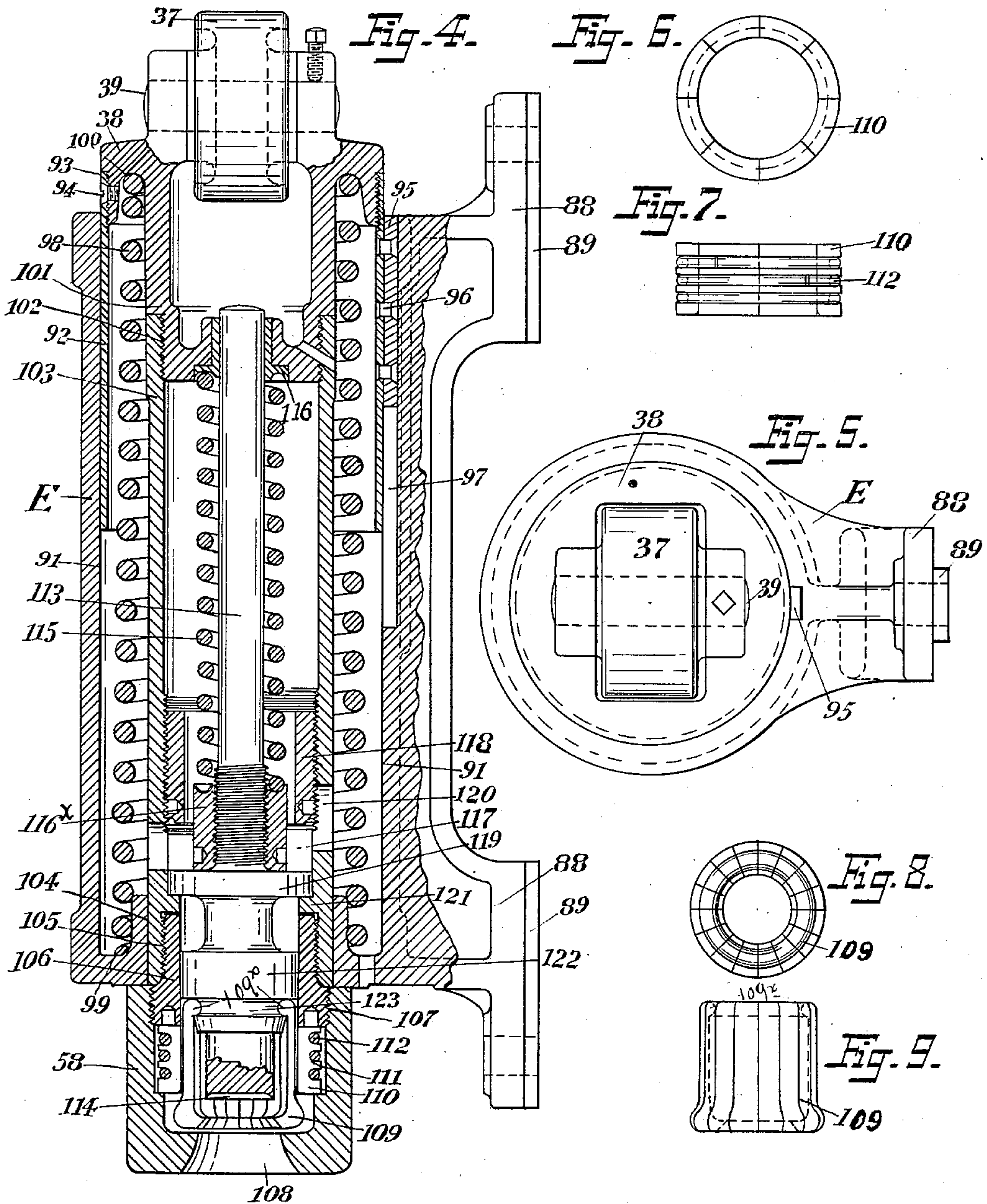
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6 SHEETS—SHEET 3.



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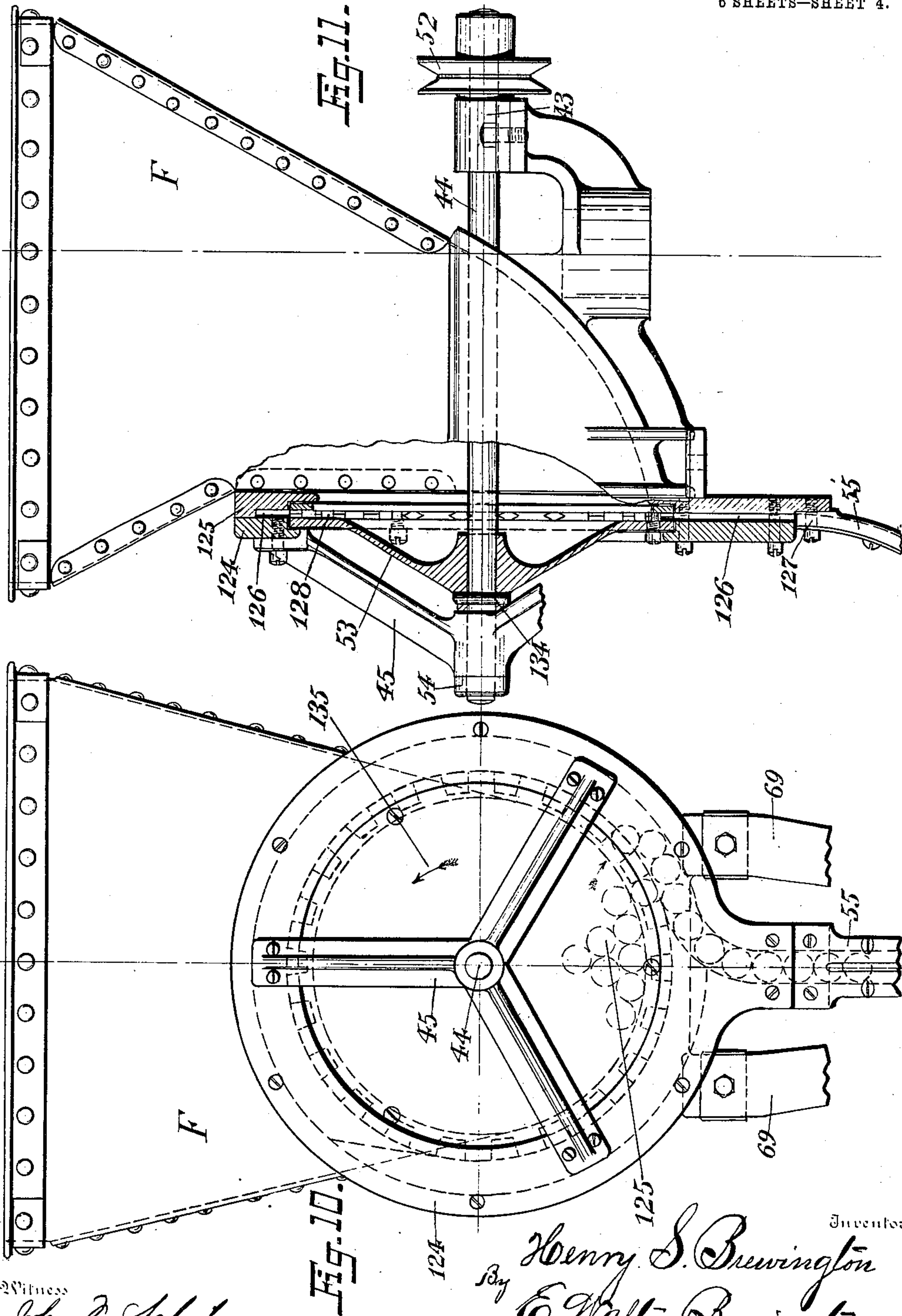
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6 SHEETS—SHEET 4.



Witness

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Fig. 10.

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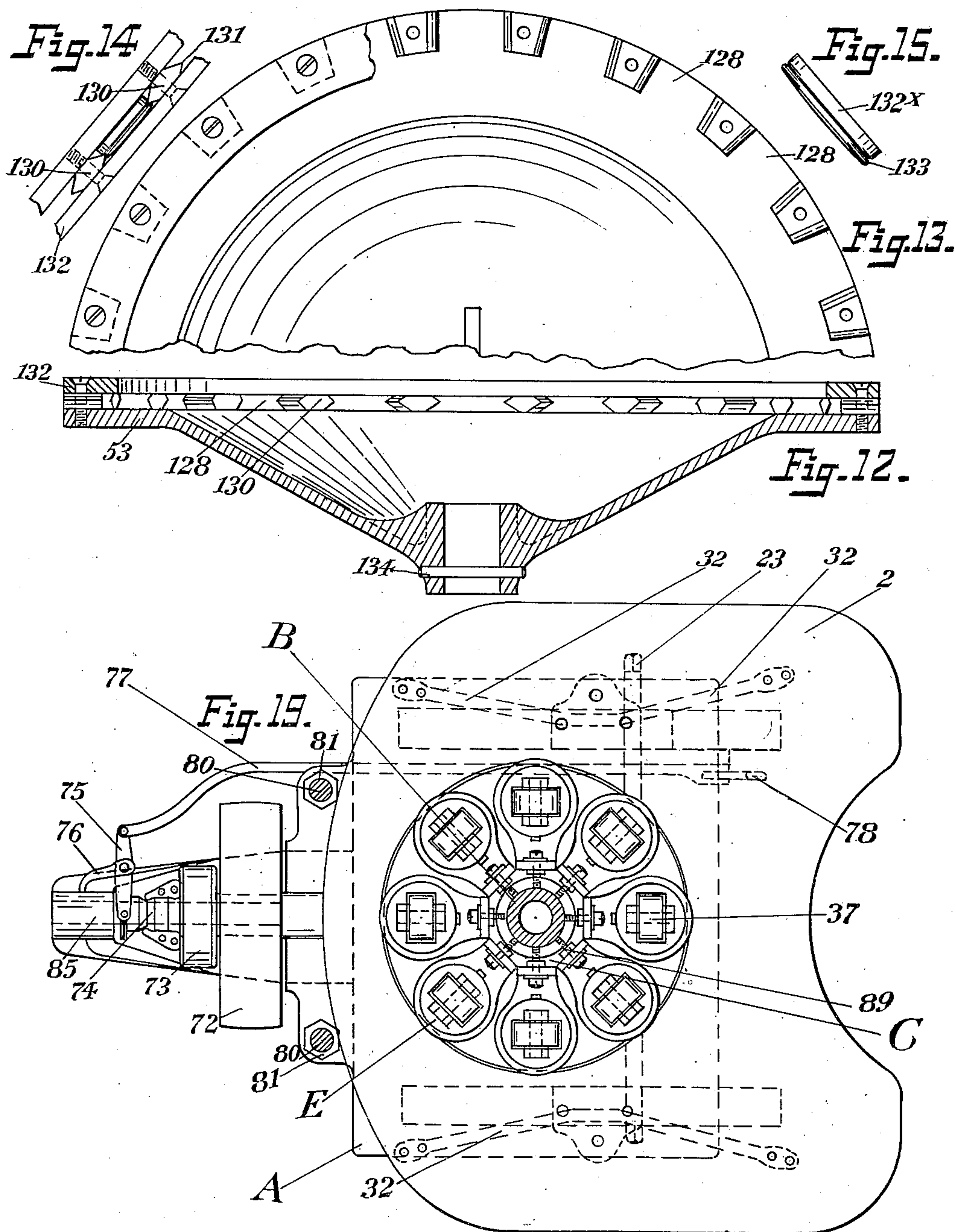
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6 SHEETS—SHEET 5.



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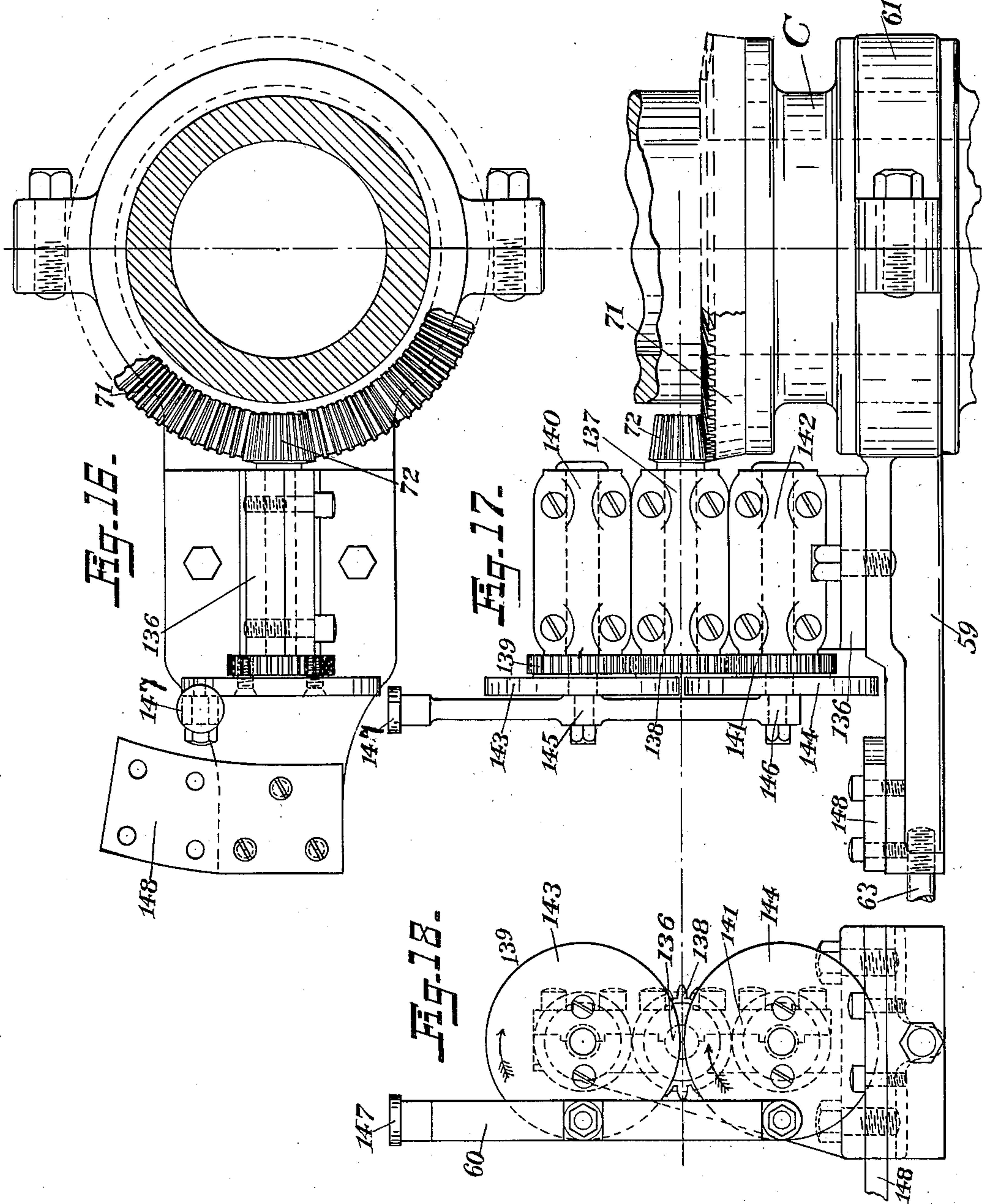
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6 SHEETS—SHEET 6.



Witness
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UNITED STATES PATENT OFFICE.

HENRY S. BREWINGTON, OF BALTIMORE, MARYLAND.

BOTTLE-CAPPING MACHINE.

No. 860,787.

Specification of Letters Patent.

Patented July 23, 1907.

Application filed August 9, 1906. Serial No. 329,878.

To all whom it may concern:

Be it known that I, HENRY S. BREWINGTON, a citizen of the United States, residing at Baltimore city, State of Maryland, have invented certain new and useful
5 Improvements in Bottle-Capping Machines, of which the following is a specification.

My invention relates to an improvement in rotary bottle capping machines, and is adapted to automatically feed a suitably shaped metal cap to a point where
10 it is engaged with the head of a bottle, and by bending a portion or portions of the flange of the cap into locking contact with the bottle head it is secured thereon.

It is the object of my invention to provide a machine of this class in which the cap feeding mechanism instead of being operated by hand is automatically accomplished by the machine. By means of rotary carriers, the bottles are presented singly in line with the capping mechanism and by the means of the hopper mechanism, the caps are fed one at a time into the
15 crowning head or mechanism and as the head descends it automatically secures the cap therein contained on the head of the bottle, which by certain mechanism to be more particularly hereinafter described has caused the bottle to be moved along until it is in direct line
20 with the capping head. After being capped the bottle is released from the capping head and continues on its way by means of the rotation of the table until it reaches a point where it is swept therefrom by means of an arm or it can be removed by hand. The capping head or
30 mechanism is so constructed that variations in bottle heads are overcome as well as the variations to a certain degree as to the height of bottles, while the rotary table is constructed so that it may be raised and lowered so that the machine may be adapted for the use of bottles
35 of different size. The cap feeding mechanism and the bottle feeding device as well as the mechanism of securing the cap on the bottle head is operated from a single source of power, the several steps in the operation of the entire machine being so related as to insure a steady
40 and continuous automatic action of the machine, and to do so in such a manner that there is little or no vibration about the machine such as would cause the gases to rise from the contents of the bottles when being used in the bottling of goods of this nature.

45 With these ends in view the invention consists in certain novel features of construction and combinations of parts which will be hereinafter described, and pointed out in the appended claims.

In the accompanying drawings forming a part of this
50 specification—Figure 1 is a general front view of the machine, shown partly in section. Fig. 2 is a view of the crank for elevating and lowering the table of the machine. Fig. 3 is a general side view of the machine with some parts omitted for clearness. Fig. 4 is an assem-

bled view of the capping cylinder shown mostly in section. Fig. 5 is a top plan view of the capping cylinder. Fig. 6 is a top plan of the assembled flexible ring for closing the bending fingers. Fig. 7 is an elevation of the same. Fig. 8 is a top plan assembled view of the bending fingers. Fig. 9 is an elevation of the same.
60 Fig. 10 is a front view of the hopper, which faces the left hand side of the machine. Fig. 11 is a side view of the hopper as seen from the front of the machine; the operative parts being shown in section. Fig. 12 is a sectional view of the tumbling and selecting chamber
65 of the hopper. Fig. 13 is a partial inside view of the same. Fig. 14 is a small edge view of the chamber, showing one outlet for crowns with a crown in position for passing out. Fig. 15 is a full size view of a crown to show more clearly the exact shape of the outline, which
70 is utilized for selecting the crowns. Fig. 16 is a plan view of the mechanism for tucking the crown up from the chute into the bending jaws. Fig. 17 is an elevation, and Fig. 18 is an end view of the said mechanism. Fig. 19 is a partial general plan of the machine with the
75 inner column broken off at the point indicated by (a) in Fig. 1, and the top parts of machine removed. This view shows the arrangement of the 8 crowning heads arranged around and bolted to the revolving chamber, also the plan of starting lever connection to the friction
80 clutch for operating the machine.

In Fig. 1—A is the base of the machine, 1, 1. are the two supporting sides for the table 2. B is the base part of central column, which is bolted to base A, C is a revolving sleeve loosely fitted to column B¹, so as to re-
85volve freely, and having a projecting flange 3 on its lower extremity to which is attached the bevel ring gear 4 by means of the bolts 5. 5., fitted into the lower side of flange 3 is a ball bearing ring 6, being located opposite to a ball bearing ring 7 fitted into the base of
90 column B, and being provided with thrust balls 8. 8. to carry the weight of sleeve C and the parts attached thereto. On the outside of sleeve C is fitted a circular cage D which is secured to sleeve C by the key 9, thus compelling cage D to move in unison with sleeve C
95 and being free to slide up or down on the same, to adjust itself to the various heights of bottles. This adjustment is effected by turning the split nut 10 around on the thread 11 cut in the sleeve C. Between nut 10 and cage D is introduced the anti-friction ring 12. To
100 secure split nut 10 after adjusting, it is provided with two clamping screws at 13. 13. Cage D is provided with cylinders 14, one of which is shown externally and a second one in section. Within each cylinder is inclosed a plunger head 15 connected to a plunger rod
105 16, which is provided on its lower end with two nuts 17, for the purpose of changing the tension of resisting spring 18 by a greater or less degree of compression,

after adjusting the amount of compression on spring 18. The plunger head 15 is adjusted to the height of the table 2 by means of the threaded plug 19, through which the plunger rod 16 is free to slide. The plunger head 15 is provided with a cushion buffer plate 20 to overcome the irregularity in the shape of bottles by conforming therewith, and also to absorb the shock occasioned by the sealing action. Adjustably secured to the top of cage D by screws at 21 are the bottle guides 22 for the purpose of centralizing the bottle on the cushion buffer plate 20. These bottle guides are of different size, adapted to the various size of bottles being acted upon, and are selected and placed in position before starting the sealing process.

Shaft 23 with its pinion gears 24, crank handle 25, Fig. 2, ratchet gear 26, Fig. 1, pawl 27, secured by bolt 28 (rack 29, secured to the vertical slide 30, by bolts 31, shown in Fig. 3), table braces 32, Fig. 1, clamping bolts 33 and 34 are all parts of mechanism having for their purpose the elevating and lowering of the table 2. The action of this mechanism is more clearly shown in Fig. 3 and will be described further on.

Secured to the periphery of sleeve C by means of bolts 35 and 36 are a series of crowning heads E corresponding in number to the cylinders in cage C, each one being arranged in a central, vertical line, directly over its corresponding cylinder in said cage. Roller 37, attached to the sliding part 38 by a roller pin at 39 is acted upon by a stationary cam 40, which in turn is securely fastened to the top plate 41.

The interior construction of the crowning heads E is fully shown in sectional view Fig. 4, and its action will be described further on.

Top plate 41 is tightly fitted upon the upper end of column B¹, and is secured thereto by any suitable means, its principal function being to provide a stable support for cam 40, also to carry the hopper F which contains the supply of crowns to be placed upon the bottles being acted upon. The bottom part of hopper F is formed by a metal casting 42, which is extended at the rear to form a bearing 43, for shaft 44, which shaft extends through said hopper F to a bearing 45 at the opposite side of the hopper. The casting 42 is bored out at 46 and is fitted tightly on the top end of column B¹, its lower surface resting on top plate 41, thus forming a support for the hopper F; casting 42 is further supported by two projecting feet cast thereon, one of which is shown at 47; these feet rest upon the bosses on plate 41, and are secured to the same by screws 48.

Directly underneath plate 41 and firmly secured to the revolving sleeve C is the grooved pulley 49, around this pulley 49 passes a round belt 50, which is guided upward by two idlers 51, which run on pins affixed to plate 41, the belt 50, then passes upward, and around pulley 52, which is affixed to shaft 44, power being transmitted to the machine by the pulley 72^x on the shaft 74, and through the pinion gear 87, to the bevel gear 4, which is secured on the revolving sleeve C at its lower extremity; groove pulley 49 being secured to the upper end of the sleeve transmits its motion to belt 50, which passes around idlers 51, and transmits its motion to pulley 52, which in turn drives shaft 44, which gives the rotary motion to the tumbling disk 53 on the front side of the hopper F. Set collar 54 is secured to shaft 44 to hold it in a lateral position.

Crown chute 55, with its removable cover 56 is affixed to the circular part of hopper F at 57, and provides a means for crowns to pass from the tumbling disk 53 downward to the mouth of the closing device which is inclosed in part 58.

59 is a supporting arm for carrying the tucker bar 60 and its attachments; arm 59 is stationary and is supported at one end by a bearing with a removable cap 61, which encircles the revolving sleeve C and is loosely fitted thereto. The other end of the arm 59 is clamped to a stand 62 by means of the clamping nut and stud 63. This stud is free to move vertically through a slot 64 in stand 62, for the purpose of raising and lowering the table 2 suitably for the different heights of bottles, after adjusting the height of the stud it is then securely clamped to stand 62 by a clamping nut 63, the stand 62 being in turn permanently secured to table 2 by screws at 65.

The support 66 is secured to the plate 148, which in turn is secured to the arm 59, for the purpose of supporting the chute 55, at the point 67, also for sustaining the weight of the arm 59 when the clamping nut 63 is released. The chute 55 passes through support 66 at the point indicated. Support 66 is secured by bolts 68 to carrying bars 69 (one of which is shown in this view) which are secured on their upper ends to plate 41 by screws at 70.

71 is a circular bevel gear, attached to revolving sleeve C, and which revolves pinion 72; the function of pinion 72 will be described in connection with Figs. 16, 17 and 18, where the whole tucking device is shown in detail.

In Fig. 3 is shown a side elevation of machine, with two of the crowning heads E in position.

72^x is the driving pulley, attached to the friction clutch 73, both revolving loosely on driving shaft 74, clutch 73 being operated upon by fork lever 75 fulcrumed in stand 76 and connected by bar 77 to operating hand lever 78, which in turn is fulcrumed on stand 79. This driving pulley, clutch, starting lever and connections are of the ordinary conventional type in common use on machines of this class and for which no claim of novelty is made, and further description is deemed unnecessary.

80 are two stay rods both shown in Fig. 19 in section, rigidly secured to base A by threads and check nuts 81 at their lower ends, and passing through top plate 41 at their upper ends, and giving rigidity to the same by clamping nuts 81. 81. on the upper and lower sides thereof. These provide increased resistance to the thrust of cam 40 as shown in Fig. 1, when acting against roller 37.

82 is an extension casting, bolting to base A at 83 and 84 in the present case, but this can be made a part of base A if found desirable. Extension 82 provides bearings at 85 and 86 for driving shaft 74.

Bevel pinion 87 which is keyed fast to shaft 74 transmits its motion to ring gear 4 by its teeth engaging therein, which in turn transmits motion to the revolving sleeve C and parts attached thereto.

When it is desired to raise table 2 the crank 25, Fig. 2, is placed on shaft 23 and turned to the left. The pinion 24 shown in Fig. 1 being keyed on the shaft 23 and engaging in rack 29 raises the slide supports 30. 30. and the table 2 attached to the desired height, the

same being held in position by pawl 27 falling into the teeth of ratchet 26. This adjustment is further secured by tightening the clamping nuts 34 on the slide 30.

Fig. 4 is a vertical view of the crowning head E with its working parts shown in section and Fig. 5 a plan of the same.

E is the main cylindrical body casting of the crowning head with projecting rings at 88 and tongue 89 which is tightly fitted to a corresponding groove in the part of sleeve C shown at 90 in Fig. 3. The body E being firmly fastened to sleeve C by bolts 36. Body E Fig. 4 is cylindrically bored on lines 91 to permit the downward sliding motion of 38 in the action of crowning. Sliding part 38 has an extension sleeve 92, threaded on its exterior part at 93 and permanently secured by screw 94 to afford a long bearing surface. Key 95 is secured to sleeve 92 by rivets 96 and sliding in the key way 97 in the body casting E to prevent its rotating.

Coiled spring 98 rests on the lower inner surface of body E at point 99 its upper end abutting against the inner surface of slide 38 at point 100, its function being to keep the roller 37 pressed against cam 40, Fig. 1, and to bring slide 38, Fig. 4 back to its normal position, after being depressed downwardly by the roller 37 passing under the curved surface of cam 40, Fig. 1.

Slide 38, Fig. 4 has an inner projecting sleeve 101, with a threaded end at 102, on which is screwed the connecting sleeve 103 which passes downwardly through a sliding joint in body E at point 104 at the lower end of connecting sleeve 103. It is threaded internally at point 105 to receive the connecting plug 106. Plug 106 has an external thread at 107 on which is screwed the guide 58. Guide 58 is of cylindrical form and has a bell-shaped opening 108 at its lower end to guide the top of the bottle entering centrally, towards the crimping fingers 109.

110 is a flexible closing ring, shown in plan in Fig. 6 and in elevation in Fig. 7. This closing ring is cut in any desired number of parts, so as to conform to the irregularities of a bottle head and has a number of grooves 111 cut around it, within these grooves 111 are placed spring rings 112. Their compressing action causing the ring 110 to close the crimping fingers 109 which are similarly made of a number of individual parts (in the case shown of 16) against the metal top on the crown, bending the same under the projecting lip formed around the top of the bottle being sealed and by their adjustability conforming thereto.

113 is a central spindle for pressing downwardly on the crown being crimped against its cupped lower end at point 114. Spindle 113 is pressed downwardly by coiled spring 115, which abuts against the bearing 116, formed in the lower end of slide 38, through which spindle 113 is free to slide. The opposite and lower end of spring 115 rests against the threaded sleeve 116 \times , which is screwed on spindle 113. Said sleeve 116 \times being adjustable by means of a spanner introduced through the openings at 117, through the threaded sleeve 118 for the purpose of changing the tension of spring 115. Threaded sleeve 118 acts as a stop to the upward motion of spindle 113 by coming in contact with collar 119 formed on spindle 113. Sleeve 118 is also adjustable in the same manner as 116 \times by a spanner being introduced through opening 120, in connecting sleeve 103,

The downward motion of spindle 113 is limited by its coming in contact with the shoulder 121 formed on the inner surface of sleeve 103. A collar 122 is formed on spindle 113 for the purpose of forming a guide to the same. Around spindle 113 is formed an annular groove at 123 for carrying the ball shaped ends 109 \times of the crimping fingers 109, thereby supporting the fingers in position and furnishing a hinge for their swinging movement in the action of crowning.

Fig. 10 is a front elevation of hopper F showing the spider shaped bearing support 45 for shaft 44; the cover ring 124, the supports 69. 69. which carry the tucking device, shown in Figs. 16, 17 and 18. Fig. 10 also shows by the dotted circles at point 125 the location of crowns in the tumbling chamber 53, Fig. 1 and the direction which they follow in passing into the chute 55.

Fig. 11 is a side view of hopper F showing the tumbling chamber 53 in section. 125 is the circular front part of the hopper in section, within which is formed the channel 126 for conveying the crowns to chute 55 which is secured to the hopper by screws at point 127. 128. 128 are openings through tumbling chamber 53, through which the crowns pass outwardly. This is shown more fully in Figs. 12. 13 and the small broken outside view of the rim Fig. 14. In this view, is shown the dividing blocks 130. 130 which form the divisions of the several openings 128 and by their pointed sides 131 which are made nearer to the back cover ring 132 than they are to the front of the tumbling chamber 53. It is evident that the crowns can only pass through openings 128 when they have assumed the position desired for being passed through chute 55, Fig. 1, so as to be presented to the bottle, with the open side downward. In Fig. 15 is shown a crown 132 \times , with the depression or groove extending around the same at point 133. The location of this groove 133 being nearer the top, or closed side of the crowns is thus utilized for the purpose of only allowing them to pass into chute 55 in the desired position. Pin 134 secures the tumbling chamber 53 to shaft 44, Fig. 11 so as to rotate with it in operation. This chamber 53 tumbles the crowns which have been supplied to hopper F so that as they assume many positions each one finally presents itself to the opening 128 in the only way in which it can pass outwardly. In case a crown passes partly through opening 128 and by reason of the chute 55 and the channel 126 being already full to the point where the crowns are delivered into the channel or from any other cause, it is carried to the upper part of chamber 53 in its circular movement, which is indicated by an arrow 135, Fig. 10, and falls downward in the mass in chamber 53, to be further tumbled until an opportunity presents for it to be discharged.

Fig. 16 is a top plan of the tucking device. Fig. 17 a front view, and Fig. 18 an end view of the same. Arm 59 with its removable part 61 is loosely fitted to the revolving sleeve C and rests thereon, the opposite end being supported by clamping bolt 63 which secures it to table stand 62, as shown in Fig. 1. Upon arm 59, Fig. 17 is bolted a bearing support 136 which carries the bevel pinion gear 72, with its shaft 137, indicated by dotted lines, and its spur gear 138. Spur gear 138 is geared into spur gear 139 attached to its spindle 140. Gear 138 is also geared into a similar gear 141 on its lower side—gear 141 having a spindle 142. On the ends of

spindles 140 and 142 are secured two disks, numbered respectively 143 and 144, motion being transmitted to this train of gears from ring gear 71. Disks 143 and 144 rotate in the same direction (indicated by arrows) and

5 raise the tucker bar 60, which is attached to the disks by bearings 145, 146; on the upper end of tucker bar 60 is a round button 147. This button enters the crown which has assumed its proper position at the lower end of chute 55, Fig. 1 at the instant that one of the crown-

10 ing heads E is in a central position over the same. As the head E continues traveling in its circular path, concentric to center of column B¹, the pusher bar 60 raises the crown into the crowning head where it is seized and held in position by the yielding crimping fingers 109,

15 Fig. 4, and then descends to repeat the operation, at the time when the next succeeding head E arrives in a central position over the same. There being eight times as many teeth in the ring gear 71, Fig. 17, as there are in the pinion gear 72, the complete operation is suc-

20 cessively performed on each of the heads E, E, etc., as they pass the proper point. Attention is directed to the motion imparted to the tucking bar 60 by the rotation of the disks 143 and 144 as shown in Fig. 18, the bar is not only raised to a sufficient height to place the

25 crown in the crimping fingers 109, Fig. 4, but it is also made to travel in the direction in which the heads E, E, are moving at the same approximate speed, and in approximately the same path in which the heads E, E are traveling, the two motions being sufficiently iden-

30 tical to cause the device to fulfil its function, for example: While the tucker bar 60 is manifestly traveling in a vertical plane while the sealing head is traveling in a horizontal plane, it is explained that, as the crank pins 145 and 146 which propel the tucker bar arrives at

35 a point one-half its vertical travel as in the position shown in Fig. 18, (which is the point selected for the action to be utilized to raise the tucker bar for the purpose of inserting the crown in the sealing head), and after this time and during the time that the said crank

40 pins are traversing the upper half of their revolution they are also traveling in a horizontal plane in the same direction as that of the sealing head, and, as stated, they travel approximately in the same path, in other words, they are both traveling upward in a vertical plane and

45 forward (in approximately the same path as the sealing head) in a horizontal plane.

The action of the complete machine is as follows: The hopper F, Fig. 1 having been supplied with a sufficient quantity of crowns, the machine is started by the

50 operator pulling the lever 78, Fig. 3 towards himself, and throwing in the clutch 73, motion being communicated to the revolving parts as previously described. The crowns are tumbled in chamber 53, Fig. 11, until a sufficient quantity have been discharged through the

55 openings 128, 128, Fig. 13, into chute 55, Fig. 1. The operator then places the bottles to be sealed on the flexible disks 20 as they pass around before him. The guides 22 assisting in locating the bottles centrally, as they pass around the machine, the sliding parts 38 of

60 the crowning heads E, Fig. 4 are forced downwardly by the roller 37 coming in contact with the cam 40, Fig. 1, and the crowns which have been placed in the crimping fingers 109, Fig. 4 by the action of the tucking device previously described are forced upon the top of

65 the bottle and held by the resisting force of spring 115

acting upon central spindle 113, a continued downward movement of slide 38 compresses spring 115 and the compressing ring 110 moves downward against the curved part of fingers 109 and forces them inwardly, clenching the lower edge of the crown flange around and

70 partly underneath the outside annular ring on the top of the bottle. Should a bottle be longer than the length for which the machine has been adjusted, such extra length has been provided for by the spring 18, Fig. 1, which allows the bottle to descend into the cylinder D,

75 and after the full downward movement of slide 38, Fig. 4 due to the action of cam 40, has been completed, roller 37 leaves cam 40, Fig. 1 and the moving parts in cylinder D assume their normal position. The slide 38, Fig. 4 with its attached parts, also is lifted back to

80 its normal height by the action of spring 98, which has been compressed to an extent equal to the downward movement resulting from the action of cam 40 against roller 37. The bottle is now free to be removed from the machine, and this cycle of operations can be con-

85 tinued as long as the operator places bottles in position to be crowned, and the supply of crowns in the hopper is maintained.

Slight changes might be resorted to in the form and arrangement of the several parts herein described with-

90 out departing from the spirit and scope of my invention and hence I do not desire to limit myself to the exact construction as herein set forth; but,

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

95

1. A machine for applying crown seals to bottles, comprising a series of rotatable sealing heads, means for automatically feeding crowns thereto, a series of bottle supporting devices, means for rotating the heads and supporting devices in unison, and means for causing the sealing

100 heads to descend and ascend from the supporting devices during such rotation, substantially as described.

2. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, means for automatically feeding crowns thereto, a series of bottle supporting devices adjustable with relation to the sealing heads, means for rotating the heads and supporting devices in unison, and means for causing the sealing heads to descend and ascend from the supporting devices during

110 such rotation, substantially as described.

3. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, means for automatically feeding crowns thereto, a series of bottle supporting devices, means for centering the bottles on said supporting devices, means for rotating the heads and supporting devices in unison, and means for causing the heads to descend and ascend from the supporting devices during

115 such rotation, substantially as described.

4. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, means for automatically feeding crowns thereto, a table, a series of bottle supporting devices adjustable in said table with relation to the sealing heads, means for rotating the heads and supporting devices in unison and means for causing the heads to approach and recede from the supporting devices

120 during such rotation, substantially as described.

5. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, means for automatically feeding crowns thereto, a table, a series of bottle supporting devices mounted in said table, means for adjusting the height of the table, and means for causing the sealing heads to approach and recede from the supporting devices, substantially as described.

130

6. A machine for applying crown seals to bottles comprising a series of sealing heads, means for automatically feeding crowns thereto, a table, a series of bottle supporting devices mounted in said table, and means for adjusting the table and supporting devices separately with relation to

135

each other and the sealing devices, substantially as described.

7. A machine for applying crown seals to bottles, the combination of a series of rotatable sealing heads, means for feeding crowns to the mouths of the sealing heads, a table, bottle supporting devices mounted in the said table, means for forcing the crowns from the mouths into the sealing heads, and means for causing the sealing heads to approach and recede from the supporting devices, substantially as described.

8. A machine for applying crown seals to bottles, comprising a series of rotatable sealing heads, means for feeding crowns to the mouths of the sealing heads, a tucker bar for forcing the crowns into the sealing heads, and means for reciprocating the said tucker bar and causing it to travel in the same direction as that of the heads, substantially as described.

9. A machine for applying crown seals to bottles, comprising a series of rotatable sealing heads open at their lower ends, means for feeding crowns to the mouth of each sealing head, a reciprocating tucker bar for forcing the crowns upward from the mouth and into each sealing head, and means for causing the tucker bar after ascending to a point necessary to secure the crown within each respective sealing head to travel in the same direction as that of the said sealing head, substantially as described.

10. A machine for applying crown seals to bottles, comprising a series of sealing heads, means for automatically feeding crowns to the mouths thereof, a reciprocating tucker bar for forcing the crowns from said mouths into the sealing heads, means for causing the tucker bar after securing the crowns within the heads to travel in the same direction as that of the heads, a series of bottle supporting devices, means for rotating the heads and supporting devices in unison, and means for causing the sealing heads to approach and recede from the supporting devices during such rotation, substantially as described.

11. A machine for applying crown seals to bottles comprising a series of sealing heads, means for automatically feeding crowns to the mouths of said heads, a plunger for forcing the crowns from said mouths into the sealing heads, a series of bottle supporting devices, means for rotating the sealing heads and supporting devices in unison, and means for causing the sealing heads to approach and recede from the supporting devices during such rotation, substantially as described.

12. A machine for applying crown seals to bottles comprising a rotatable series of sealing heads, a correspondingly rotatable series of bottle supporting devices, a non-rotatable device for feeding crowns to the mouths of the heads and correspondingly non-rotatable means for forcing the crowns into the heads, substantially as described.

13. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, a non-rotatable device for feeding crowns to the mouths of the heads, a reciprocating tucker bar for forcing the crowns into the heads, and means for causing the tucker bar to travel in the same direction as that of the heads after forcing the crowns within the heads, substantially as described.

14. A machine for applying crown seals to bottles comprising a series of sealing heads, a rotating support for said heads, means for feeding crowns to the mouths of the heads, a plunger for forcing the crowns into the heads, and means for reciprocating the plunger actuated by the support of the sealing heads, substantially as described.

15. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, each comprising a main cylindrical body, an inner cylinder, a spring surrounding the inner cylinder with a tendency to press the inner cylinder upward, an actuating plunger carried by the inner cylinder, means for automatically feeding crowns to the mouths of the heads, a roller carried on top of the inner cylinder, stationary cams to engage with the said rollers to press the inner cylinder and plunger downward against the action of the spring, and a rotatable series of bottle supports, whereby the sealing heads are made to approach and recede from the supporting devices during such rotation, substantially as described.

16. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, each comprising a main cylindrical body, an inner cylinder, a spring

surrounding the inner cylinder and supported in the main body with a tendency to press the inner cylinder upward, a plunger carried by the inner cylinder, means for automatically feeding crowns to the mouth of the heads, a roller carried on top of the inner cylinder, stationary cams to engage the roller to press the inner cylinder and plunger downward against the action of the spring, a table, a series of bottle supporting devices mounted in said table, and means for adjusting the height of the table and supports, substantially as described.

17. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, each comprising a main cylindrical body, an inner cylinder, a spring surrounding the inner cylinder and supported in the main body with a tendency to press the inner cylinder upward, means for feeding crowns to the mouths of the heads, a yielding plunger carried by the inner cylinder, a roller carried on top of the inner cylinder, stationary cams to engage the said rollers to press the inner cylinder and plunger downward against the action of the spring, a table, a rotatable series of bottle supporting devices adjustable in said table with relation to the sealing heads, means for rotating the heads and supporting devices in unison, and means for causing the heads to approach and recede from the supporting devices during the continued rotation, substantially as described.

18. A machine for applying crown seals to bottles, comprising a rigid column secured to a base, a top plate secured to the column at the upper end thereof, a cam secured to the under side of the plate, a series of rotatable sealing heads rotatable about the said column, each of the said sealing heads being yieldingly and slidably supported within a cylinder, a roller secured on the top of each of the said sealing heads, an actuating plunger in each sealing head, and a series of yielding bottle supports rotatable about the said column, the said cam acting upon the said rollers on the sealing heads whereby they are made to approach and recede from the bottle supports during the continued rotation, substantially as described.

19. A machine for applying crown seals to bottles comprising a base, a rigid column secured to the base, a top plate secured to the column at the upper end thereof, a cam secured to the under side of the plate, a sleeve rotatable about the said column, a series of yielding bottle supports carried by the sleeve, a series of rotatable sealing heads composed of a main cylindrical body, an inner yielding slidable cylinder, a spring surrounding the inner cylinder and supported in the main body, an actuating plunger in each inner cylinder, and a roller carried on top of the inner cylinder, whereby the sealing heads are made to approach and recede from the supporting devices during the continued rotation, substantially as described.

20. In a machine for applying crown seals to bottles, the combination of a series of rotatable sealing heads, each comprising a main cylindrical body, an inner cylinder, a plunger within the cylinder, a spring surrounding the inner cylinder, means for automatically feeding crowns to the mouths of the heads, a plunger for forcing the crowns into the sealing heads, a series of yielding bottle supporting devices, means for centering the bottles on said supporting devices, means for rotating the heads and supporting devices in unison, and means for causing the heads to approach and recede from the supporting devices during such rotation, substantially as described.

21. In a machine for applying crown seals to bottles, the combination of a series of rotatable sealing heads, each comprising a main cylindrical body, an inner cylinder, a spring surrounding the inner cylinder, a plunger within the inner cylinder, and means for automatically feeding crowns to the mouths of the sealing heads, a plunger for forcing the crowns into the sealing heads, a series of yielding bottle supporting devices adjustable with relation to the sealing heads, means for rotating the heads and supporting devices in unison and means for causing the sealing heads to approach and recede from the supporting devices during such rotation, substantially as described.

22. In a machine for applying crown seals to bottles, the combination of a series of rotatable sealing heads, each comprising a main cylindrical body, an inner cylinder, a spring surrounding the inner cylinder, a plunger

within the inner cylinder, means for automatically feeding crowns thereto, a plunger for forcing the crowns into the sealing heads, a series of bottle supporting devices, means for rotating the heads and supporting devices in unison, and means for causing the sealing heads to approach and recede from the supporting devices during such rotation, substantially as described.

23. A machine for applying crown seals to bottles, comprising a series of sealing heads, means for automatically feeding crowns thereto, a plunger for forcing the crowns into the sealing heads, and means for reciprocating said plunger, a table, a series of bottle supporting devices mounted in said table, and means for adjusting the table and supporting devices separately with relation to each other and with the sealing devices, and means for causing the sealing heads to approach and recede from the supporting devices during such rotation, substantially as described.

24. A machine for applying crown seals to bottles, comprising a series of sealing heads, a table, a series of bottle supporting devices mounted in said table, and means for adjusting the table and supporting devices separately with relation to each other and the sealing devices, means for automatically feeding crowns to the mouths of the sealing heads, and means for forcing the crowns from the mouths into the sealing heads, substantially as described.

25. A machine for applying crown seals to bottles, comprising a series of rotatable sealing heads each comprising a main cylindrical body, an inner cylinder, a spring surrounding the inner cylinder and supported in the main body with a tendency to press the inner cylinder upward, a plunger carried by the inner cylinder, a roller carried on top of the inner cylinder, stationary cams to engage said roller to press the inner cylinder and plunger downward against the action of the spring, and a rotatable series of bottle supports, whereby the sealing heads are made to approach and recede from the bottle supports, substantially as described.

26. In a machine for applying crown seals to bottles, the combination of a series of rotatable sealing heads, each comprising a main cylindrical body, an inner cylinder, a spring surrounding the inner cylinder, a plunger within the inner cylinder, means for automatically feeding crowns to the mouths of the sealing heads, a table, a series of bottle supporting devices mounted in said table, and means for adjusting the height of the table, substantially as described.

27. In a machine for applying crown seals to bottles, the combination of a series of rotatable sealing heads, each comprising a main cylindrical body, an inner cylinder, a spring surrounding the inner cylinder, a yielding plunger within the inner cylinder, means for automatically feeding crowns to the mouths of the heads, a table, a series of bottle supporting devices adjustable to said table with relation to the sealing heads, means for rotating the heads and supporting devices in unison, and means for causing the heads to approach and recede from the supporting devices during such rotation, substantially as described.

28. A machine for applying crown seals to bottles, comprising a base, a rigid column erected thereon, a sleeve rotatable about said column, a series of sealing heads secured to the sleeve, a hopper carried by the column, means for feeding crowns from the hopper to the sealing heads, and means for causing the sealing heads to approach and recede from the supports, substantially as described.

29. A machine for applying crown seals to bottles comprising a base, a rigid column erected thereon, a sleeve rotatable about said column, a series of sealing heads secured to the sleeve, a series of bottle supports also secured to the sleeve, means for normally pressing the sealing heads away from the supports, means secured to the column for causing the sealing heads to approach and recede from the bottle supports, a hopper carried by the column, means for feeding crowns from the hopper to the sealing heads, and means for causing the sealing heads to approach and recede from the supports, substantially as described.

30. A machine for applying crown seals to bottles, substantially as hereinbefore described, comprising a series of rotatable sealing heads, a table, a series of bottle sup-

porting devices mounted in the said table, a hopper, a chute leading from the hopper to the mouths of the sealing heads, means for delivering the crowns from the hopper to the chute by means of guiding blocks in the hopper at the mouth of the chute, whereby the crowns are delivered in proper position to be secured to the bottle head during such rotation of the sealing devices, and means whereby the sealing heads approach and recede from the supporting devices during such rotation, operated by a single source of power.

31. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, a non-rotatable hopper, a tumbling disk in the hopper, a chute leading from the hopper to the mouths of the sealing heads, and guiding blocks in the mouth of the chute to prevent the crowns from entering the chute in reversed position, substantially as described.

32. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, a non-rotatable hopper, a tumbling disk in the hopper, a chute leading from the hopper to the mouths of the sealing heads, and means for preventing the crowns from entering the chute in reversed position, substantially as described.

33. A machine for applying crown seals to bottles comprising a series of rotatable sealing heads, a non-rotatable hopper, a tumbling disk in the hopper, and guiding blocks in the mouth of chute to prevent the crowns from entering the chute in reversed position, substantially as described.

34. A machine for applying crown seals to bottles, comprising a base, a rigid column erected thereon, a sleeve rotatable about said column, a series of sealing heads secured to the sleeve, a cage carried by the sleeve, a series of bottle supports carried by the cage, a hopper carried by the column, a tumbling disk in the hopper, a chute leading from the hopper to the mouths of the sealing heads, guiding blocks in the mouth of the chute and means whereby the sealing heads are caused to approach and recede from the bottle supports, substantially as described.

35. A machine for applying crown seals to bottles comprising a base, a rigid column erected thereon, a sleeve rotatable about said column, a series of sealing heads secured to the sleeve, a cage carried by the sleeve, a series of bottle supports carried by the cage, a hopper carried by the column, a chute leading from the hopper to the heads, a tumbling disk in the hopper, and guiding blocks in the mouth of the chute to prevent the crowns from entering the chute in reversed position, substantially as described.

36. A machine for applying crown seals to bottles comprising a base, a rigid column erected thereon, a revolving sleeve around the column supported on ball bearings, gearing for rotating the sleeve, sealing heads carried by the sleeve, a cage carrying a series of bottle supports secured to the sleeve, and means carried by the column to cause the sealing heads to approach the supports, and non-rotatable crown feeding devices, substantially as described.

37. A machine for applying crown seals to bottles comprising a base, a rigid column thereon, a sleeve rotatable on the column, a cage carried by the sleeve and vertically adjustable thereon, bottle supports carried by the cage, sealing heads carried by the sleeve in register with the supports, and means for causing the sealing heads to approach and recede from the supports, substantially as described.

38. A machine for applying crown seals to bottles comprising a base, a rigid column thereon, a rotatable sleeve on the column, an annular table carried by the base and vertically adjustable thereon, a vertically adjustable cage on the sleeve surrounded by the table, bottle supports carried by the cage, and sealing heads carried by the sleeve in line with the supports, substantially as described.

39. A machine for applying crown seals to bottles, comprising bottle supports each consisting of a cylinder, a yielding and adjustably supported plunger head in the cylinder, and a circular plate removably secured to the sleeve and provided with notches in its periphery to center the bottles on the supports, substantially as described.

40. A machine for applying crown seals to bottles comprising a rotatable sleeve, a series of sealing heads supported thereon, a non-rotatable hopper, a chute therefrom to the sealing heads, a shaft in the hopper, a tumbling disk thereon, a pulley on the shaft, a pulley on the sleeve

and a belt connecting the two pulleys to drive the tumbling disk from the sleeve, substantially as described.

41. A machine for applying crown seals to bottles comprising a rotatable series of sealing heads, means for feeding crowns to the mouths of the sealing heads, and a non-rotatable tucking mechanism comprising a pair of disks below the heads, means for rotating the disks in the same direction, and a plunger mounted on the wrist pins one of which is carried by each disk, substantially as described.

42. A machine for applying crown seals to bottles comprising a rotatable series of sealing heads, means for feeding crowns to the mouths of the sealing heads, and a non-rotatable tucking mechanism comprising a ring gear rotating with the series of heads, a pinion meshing with the ring gear, a second pinion carried by the pinion shaft, a pair of disks each having a wrist pin, parallel shafts supporting the disks and having pinions meshing with the second pinion to drive the two disks in the same direction, and a plunger on both the wrist pins of the disks, substantially as described.

43. A machine for applying crown seals to bottles comprising a rotatable series of sealing heads, means for feeding crowns to the mouths of the sealing heads, and a non-rotatable tucking mechanism comprising a plunger for forcing the crowns from the mouths up into the sealing heads, and means for reciprocating the plunger vertically into the sealing head and carrying it around with said head while being reciprocated therein, substantially as described.

44. A machine for applying crown seals to bottles comprising a rotatable series of sealing heads, means for feeding crowns to the mouths of the sealing heads, and a non-rotatable tucking mechanism, comprising a plunger for forcing the crowns from the mouths up into the sealing heads, means for rotating the series of sealing heads, and connections from said rotating means whereby the plunger is vertically reciprocated into and out of a sealing head and at the same time carried around with the head, substantially as described.

45. A machine for applying crown seals to bottles comprising a rotatable series of sealing heads, each having a main cylindrical body, an inner slidable cylinder, a spring surrounding the inner cylinder and supported in the main body with a tendency to press the inner cylinder upward, a plunger carried by the inner cylinder, and stationary means for pressing the inner cylinder and plunger downward against the action of the spring, substantially as described.

46. A machine for applying crown seals to bottles comprising a rotatable series of sealing heads each comprising a main cylindrical body, an inner slidable cylinder, a spring surrounding the inner cylinder and supported in the main body with a tendency to press the inner cylinder upward, a plunger carried by the inner cylinder, a roller carried on top of the inner cylinder, and stationary cams to engage said roller to press the inner cylinder and plunger downward against the action of the spring, substantially as described.

47. A machine for applying crown seals to bottles comprising

a sealing head provided with a main cylindrical body, a slide therein carrying a roller, an extension sleeve on the slide fitting in the body, an inner sleeve or cylinder secured to the slide, and a spring surrounding the inner sleeve supported at one end on the body and bearing against the slide at the other end, substantially as described.

48. A machine for applying crown seals to bottles comprising a sealing head provided with a main cylindrical body, an inner sleeve or cylinder secured to the slide, a spring surrounding the inner sleeve supported at one end on the body and bearing against the slide at the other, a plunger within the inner cylinder carried by the slide, and a spring around the plunger within the inner cylinder and bearing at its upper end against the slide, substantially as described.

49. A machine for applying crown seals to bottles comprising a sealing head comprising a main cylindrical body, an inner cylinder in the body, yieldingly supported, a connecting plug threaded in the lower end of the inner cylinder, a plunger carried by the slide within the inner cylinder and passing through the connecting plug, and crowning mechanism carried by the outer end of the plunger, substantially as described.

50. A machine for applying crown seals to bottles comprising a sealing head, a main cylindrical body, an inner cylinder in the body, yieldingly supported, a connecting plug threaded in the lower end of the inner cylinder, a plunger carried by the slide within the inner cylinder and passing through the connecting plug, crowning mechanism carried on the outer end of the plunger, and a threaded sleeve secured within the inner cylinder and around the plunger for the purpose of limiting the upward movement of the plunger, substantially as described.

51. A machine for applying crown seals to bottles comprising a crowning mechanism provided with a plunger, a series of independent movable fingers annularly arranged about the end of said plunger and loosely attached thereto, the outer end of said fingers being shaped to form a conical mouth to receive a crown, a conical mouth for guiding the bottle head to the crown within said fingers, a sectional ring surrounding said fingers, provided with a plurality of annular grooves in its outer surface, and spring rings in said grooves yieldingly compressing said sectional ring and fingers, substantially as described.

52. A machine for applying crown seals to bottles comprising a series of sealing heads, a rotating support for said heads, means for feeding crowns in line with the mouths of the moving heads, a plunger for forcing the crowns into the heads and means for reciprocating the plunger, actuated by the support of the sealing heads, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY S. BREWINGTON.

Witnesses:

E. WALTON BREWINGTON,
MARY M. MAGRAW.