No. 638,354. Patented Dec. 5, 1899.

W. PAINTER.

MACHINE FOR AUTOMATICALLY SEALING BOTTLES.

(Application filed Oct. 28, 1898.)

(No Model.)

7 Sheets—Sheet 1.

Fig. 1.

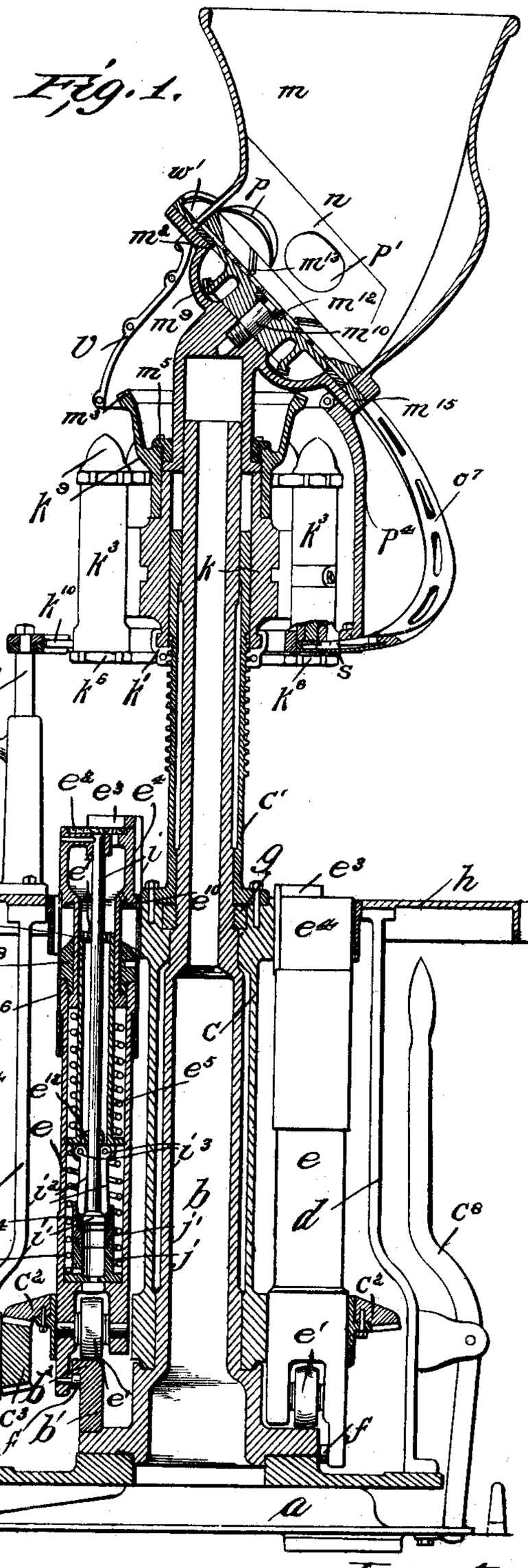

Fig. 12.

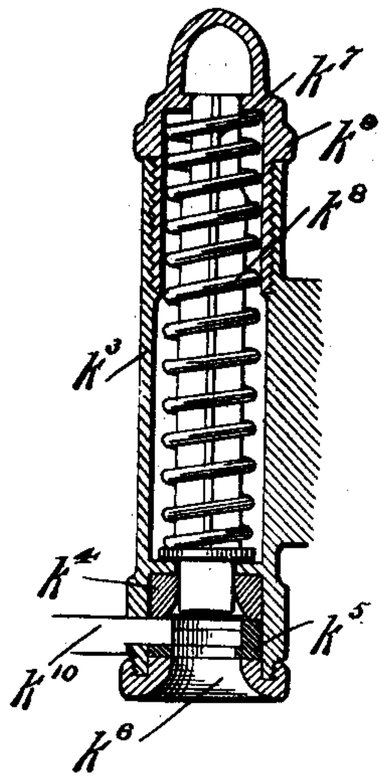

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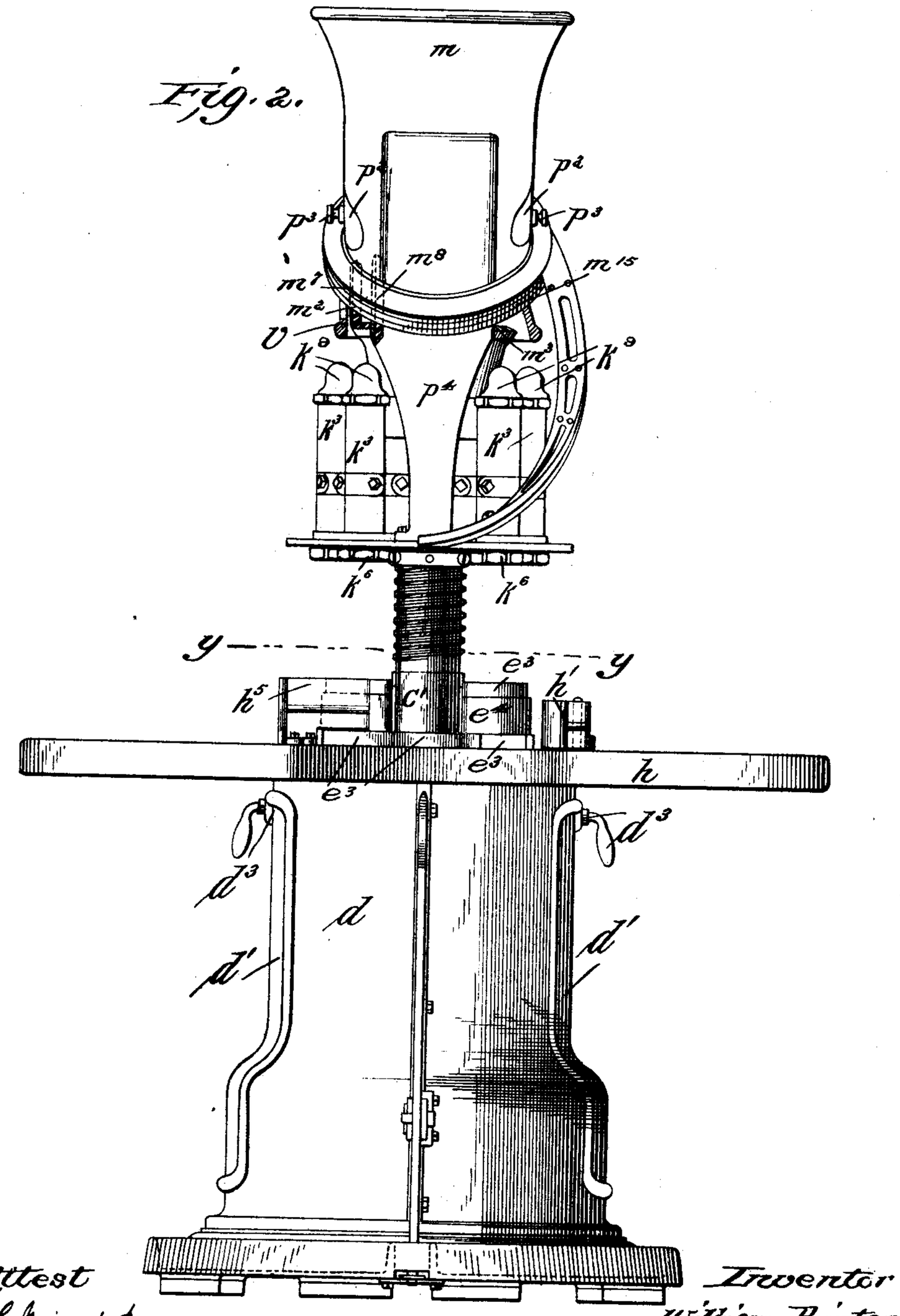
Fig. 2.



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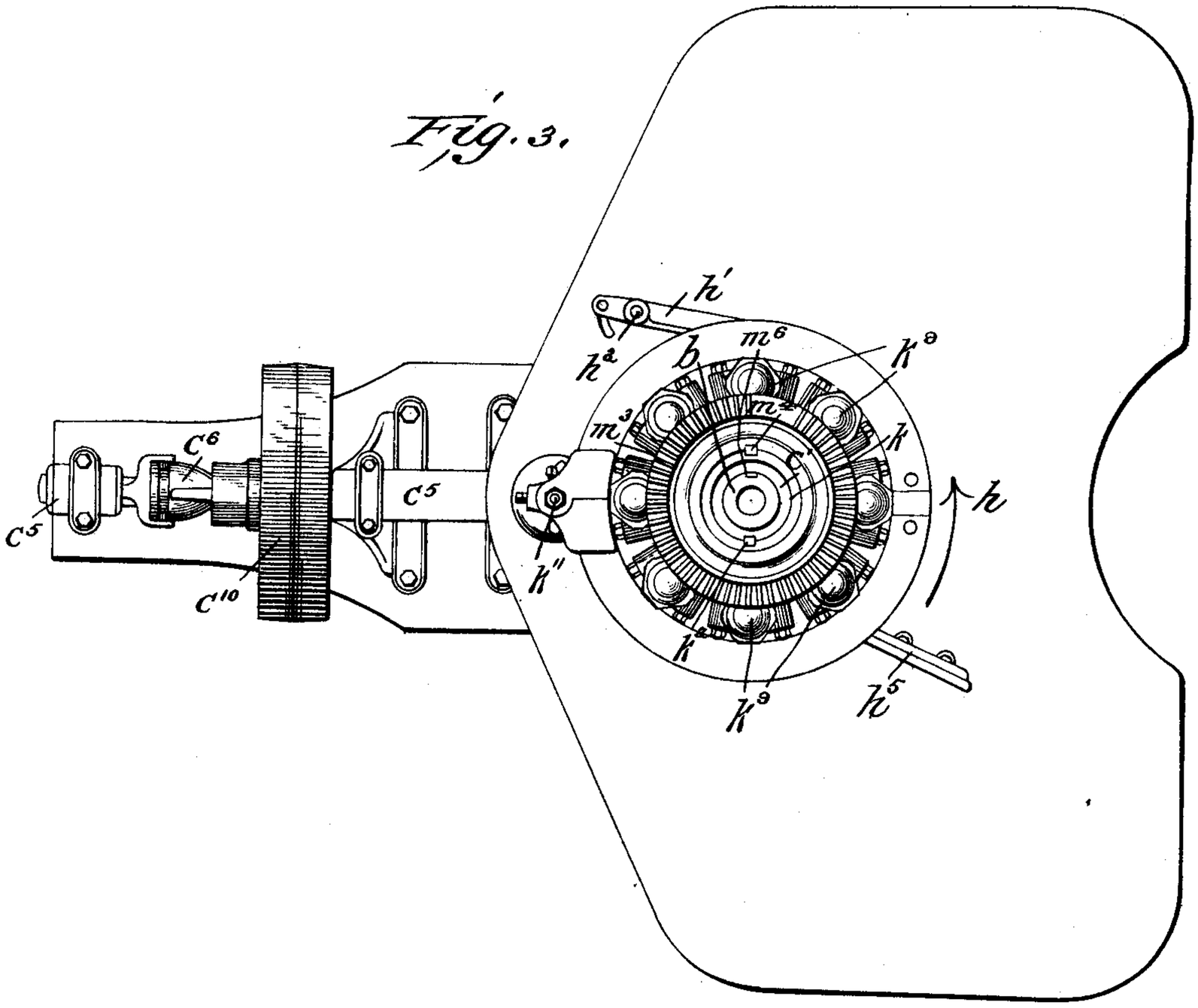
7 Sheets—Sheet 3.

Fig. 3.



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(No Model.) 7 Sheets—Sheet 4.

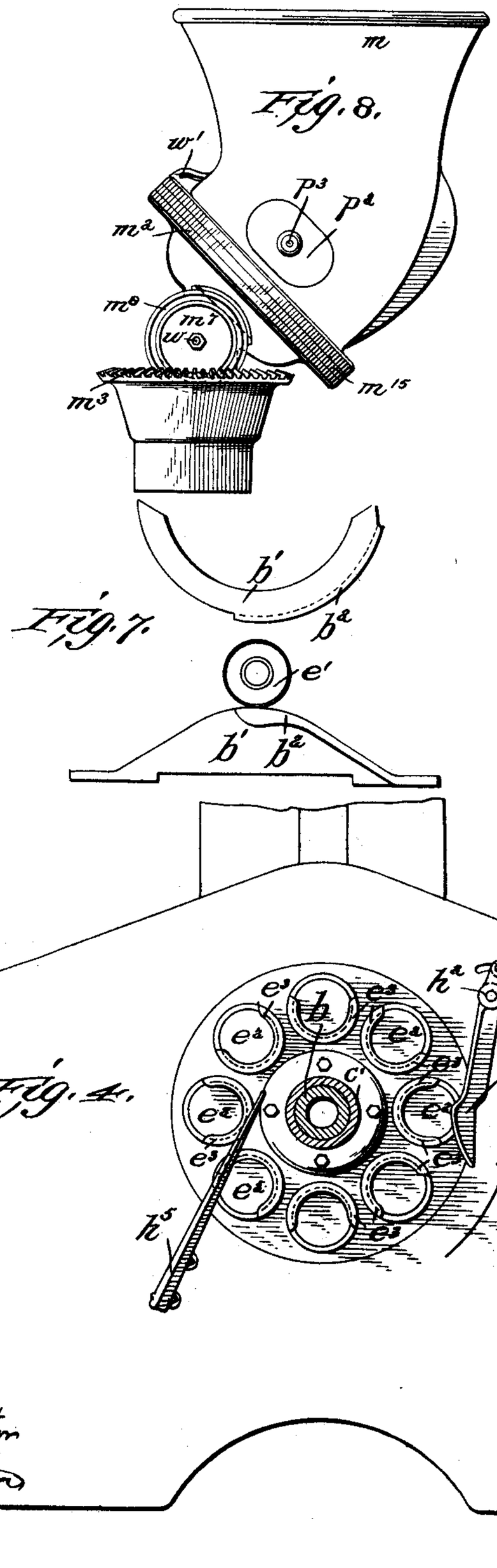

Fig. 8.

Fig. 7.

Fig. 4.

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MACHINE FOR AUTOMATICALLY SEALING BOTTLES.

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(No Model.) 7 Sheets—Sheet 5.

Fig. 6.

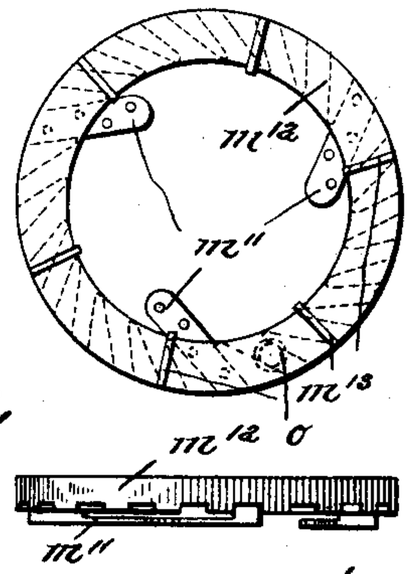


Fig. 11.

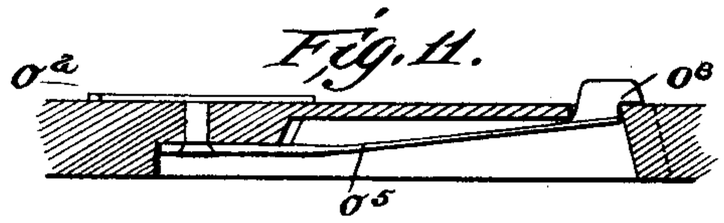
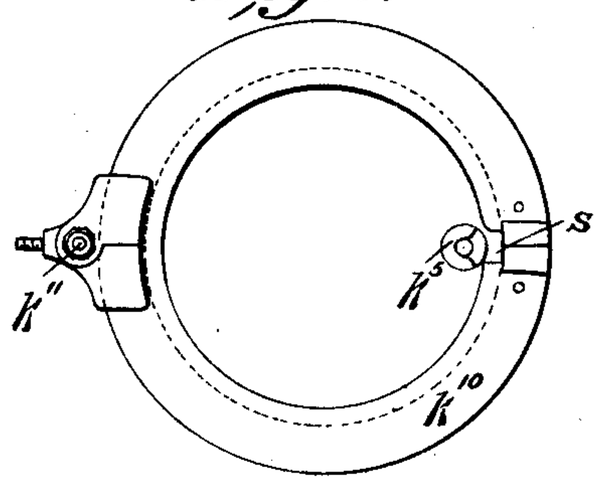


Fig. 9.



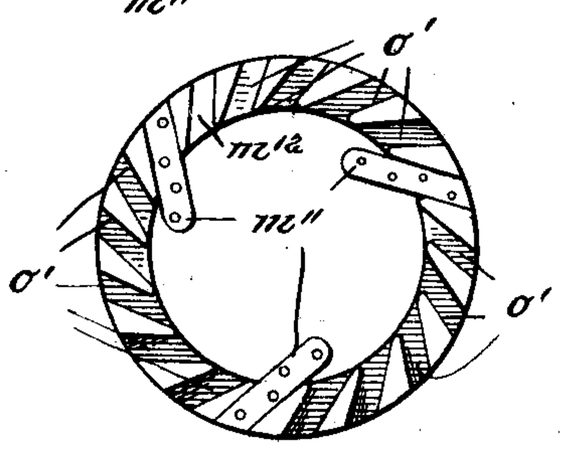


Fig. 10.

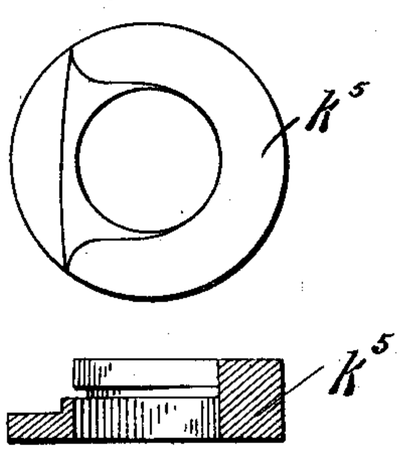
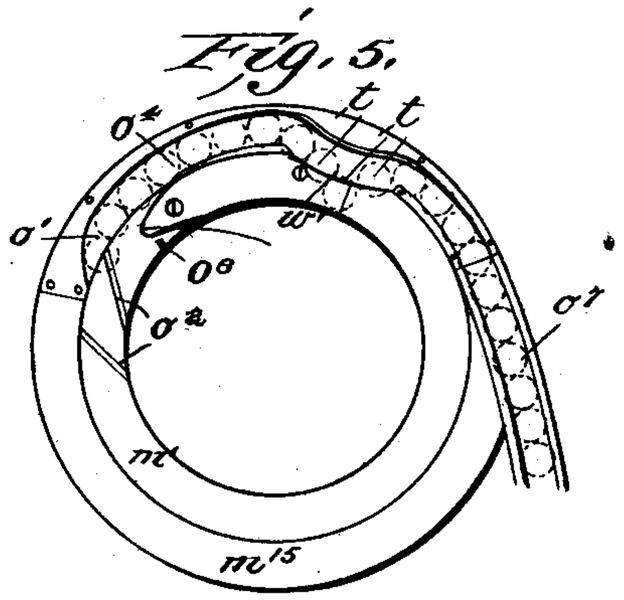


Fig. 5.



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MACHINE FOR AUTOMATICALLY SEALING BOTTLES.

(Application filed Oct. 28, 1898.)

(No Model.) 7 Sheets—Sheet 6.

Fig. 12.

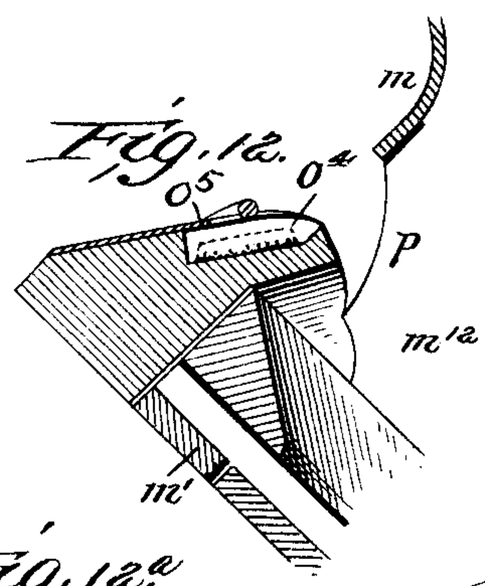


Fig. 12a.

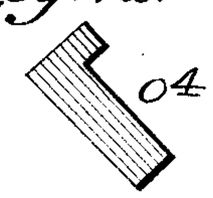


Fig. 14.

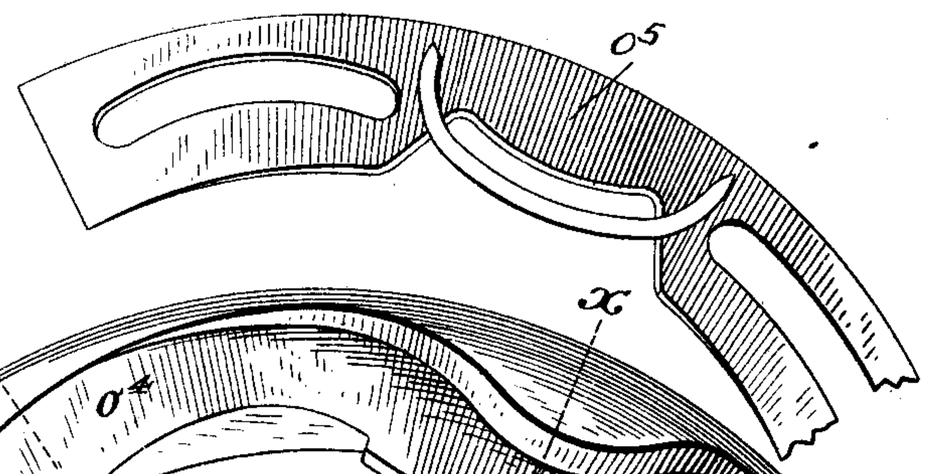


Fig. 13.

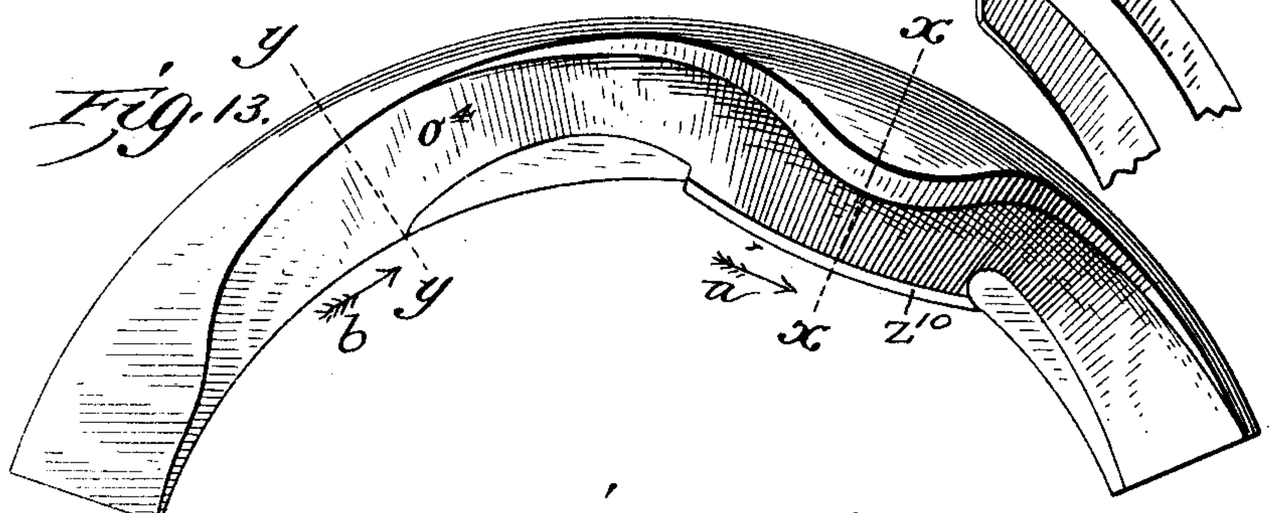
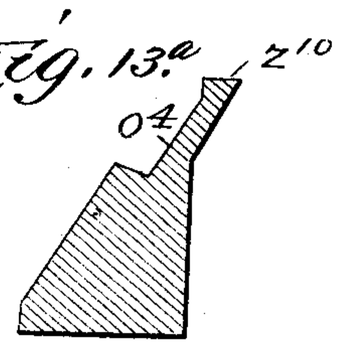


Fig. 13a.



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MACHINE FOR AUTOMATICALLY SEALING BOTTLES.

(Application filed Oct. 28, 1898.)

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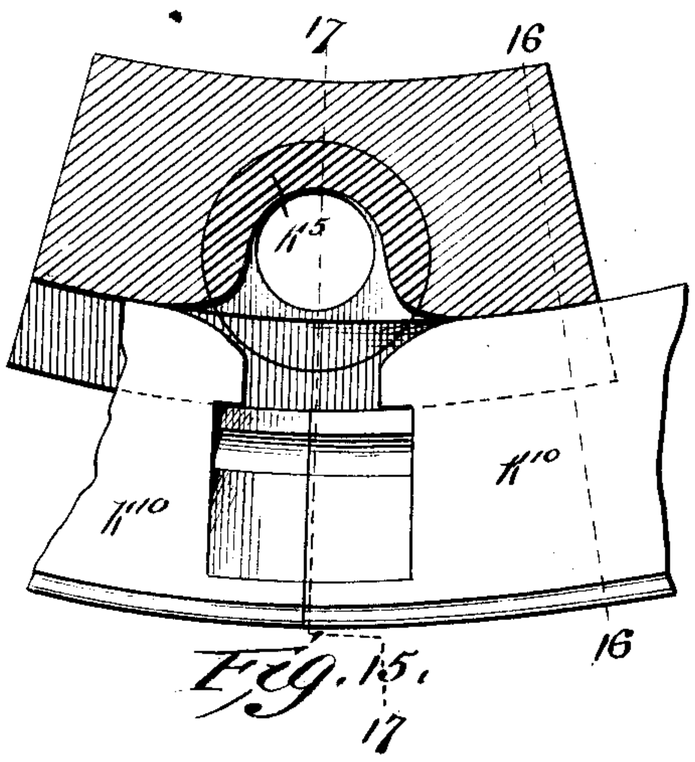


Fig. 15.

Fig. 16.

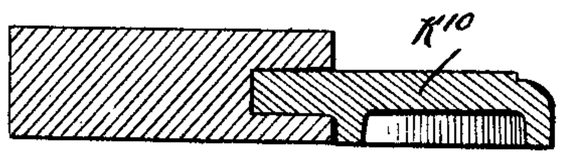
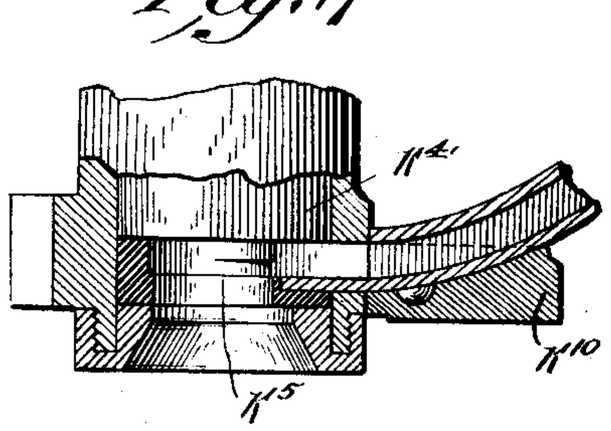


Fig. 17



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Wm. Painter
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UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY, OF SAME PLACE.

MACHINE FOR AUTOMATICALLY SEALING BOTTLES.

SPECIFICATION forming part of Letters Patent No. 638,354, dated December 5, 1899.

Application filed October 28, 1898. Serial No. 694,805. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Machines for Automatically Sealing Bottles, of which the following is a specification.

In Patent No. 473,776, granted to me April 26, 1892, I have shown and described a machine for sealing bottles by foot-power, and in an application filed by me April 22, 1898, under Serial No. 678,531, I have shown and described an improvement thereon providing for performing similar operations by steam or other extraneous power. In either of the above cases the rapidity of operation is limited by the requirement that the operator places the sealing-closure singly in the throat of the sealing-head and also places and removes the bottles in the machine singly. It is desirable for the more rapid performance of the sealing operations that the caps or seals be automatically placed in position within the sealing-head and the removal of the sealed bottles from the machine be also automatically performed, leaving to be performed by the operator only the successive placing of the bottles upon the machine. By such a machine as is hereinafter described I have increased the number of bottles which may be sealed by an operator to about double that of the machines described in the patent and application above referred to.

In the two forms of machines last mentioned the sealing-head is given vertical motion to and from the bottle and its support. In the machine made the subject of my present invention the series of sealing-heads employed are vertically stationary, while the sealing-pressure is obtained by the vertical motion of the bottle-supports. In the machine described in the application referred to above the mechanism for automatically limiting the sealing-pressure and compensating for small variations in the length of bottles of a given capacity consists of a hydraulic device fully described therein. In the present invention I accomplish the limitation of sealing-pressure and procure a similar compensation for varying lengths of bottles by different means not of a hydraulic character.

The machine which is the subject of the present invention as a whole performs all the functions of the two previously referred to, and in addition thereto automatically selects the closures from a hopper in which they are promiscuously placed and presents them with the proper side up to the sealing-heads in juxtaposition with the bottle-heads and aumatically removes the sealed bottles from the apparatus.

In the drawings, Figure 1 is a side elevation of the machine principally in section on a central line. Fig. 2 is a front elevation. Fig. 3 is a plan view with the feed mechanism removed. Fig. 4 is a partial plan in horizontal section on line $y\ y$, Fig. 2, the clutch-driving mechanism being broken away. Fig. 5 is a top view of the channel-plate of the feed mechanism. Fig. 6 is a top, bottom, and edge view of the agitating and selecting ring of the feed mechanism. Fig. 7 is a plan and elevation of a detail. Fig. 8 is a detachable elevation of the hopper. Fig. 9 is a detached view in plan of the ring k^{10} Fig. 10 shows in plan and section one of the throat-rings. Fig. 11 is a sectional view of the channel-plate m', showing the spring o^{e}. Fig. 12^{b} is a sectional view of one of the sealing-heads. Figs. 12, 12^{a}, 13, 13^{a}, and 14 show details relating to the channel o^{4}. Figs. 15, 16, and 17 are details showing the relation between the sealing-head and ring k^{10}.

a is a base-piece to which is secured a stationary hollow column b. Secured to the column b is a cam b', Fig. 7, whose rise and fall is symmetrical. Surrounding the column b is a second hollow column c, made a running fit at its top and bottom upon column b and formed into a step at its extreme lower end, which runs upon a corresponding step-surface formed on the bottom part of column b.

c' is an upward extension bolted to the column c and made a running fit at its top and bottom on column b. Column c has secured to its lower end a bevel-gear c^{2}, facing downward, which is engaged by a pinion c^{3}, secured to a horizontal shaft c^{4}, journaled in a bracket c^{5}, secured to the base a. The shaft c^{4} is actuated by a pulley c^{10} and a well-known clutch mechanism. The clutch is operated to stop or start the machine by the usual sliding cone.

c^6 through the instrumentality of levers c^7 and c^8, fulcrumed, respectively, on the bracket c^5, and a casing d, surrounding and inclosing the lower mechanism, the levers being connected by a bar.

The casing is provided with doors d', held by latches d^3, through which access may be had to the interior of the casing.

The column c has an enlargement at its top and bottom, both of which are perforated for the reception of a series of cylinders e and e^4, which slide vertically in them and in one another. The cylinders e have journaled on their lower ends rollers e', which engage the stationary cam b'. The column c is caused to revolve, carrying with it the cylinders e and e^4, and through the cam b' the cylinders e rise and fall during a part of the revolution of column c and remain down the greater part of the time. To insure the lowering as well as the raising of the cylinders e at the proper time, a small roller f, Fig. 1, is journaled on a projecting lug on each of the cylinders e, which engage an overhanging flange b^2, formed upon the cam b'. In this way as column c is rotated the cylinders e will successively rise to the position shown as occupied by the left-hand cylinder e in Fig. 1 and fall again to the original level.

The cylinders e^4 have attached to their upper ends U-shaped guides e^3, against which the bottles are placed and by which they are centered, and rubber pads e^2 are let into the tops of the cylinders to form a cushioned rest for the bottoms of the bottles.

g is a nut threaded on the column b, impinging upon a shoulder formed on the upper end of column c, to prevent column c from rising off its step by the action of cam b'.

h is a table forming a platform upon which to assemble bottles ready for placing in the apparatus, and to receive those delivered therefrom after sealing.

h' is a wiper or switch oscillating upon a pivot h^2 in the table h and held in position by a spring h^3 under the table h. (Shown in dotted lines in Fig. 4.) Its function is to wipe into place against the guides e^3 any bottles not properly placed by the operator, the bottles being placed by the operator while the tops of cylinders e^4 pass in front of him. The wiper h' is held in position by the spring h^3, in order to yield and avoid fracturing the bottles in case one should be so placed as to get caught between it and one of the horns of the guides e^3.

h^5 is another wiper rigidly secured to the table h, which switches the sealed bottles off the cylinders e^4 after having been lowered to the level of the table h after sealing.

In the operations of the parts so far described the column c and its attached mechanism is rotated in the direction of the arrows, Figs. 3 and 4, the bottles being wiped into place, while the cam b' successively raises and lowers the cylinders e and e^4 to seal the bottles, the bottles being successively placed on the rubber pads e^2 while the cylinders e^4 are in the lower position, and finally the sealed bottles are automatically removed by the wiper h^5.

The cylinders e each contain an automatic pressure-releasing mechanism to be now described. Sliding vertically within the cylinders e is a set of cylinders e^4. The middle body of cylinders e^4 is reduced in diameter to slide through and be guided by nuts e^8, made in halves to permit of their being placed in contact with the smaller diameter of cylinders e^4 and form stops for the upward limit of motion of cylinders e^4 within the cylinders e. Cylinders e^4 have sliding within them a third series of cylinders e^5, closed at the bottom and opened at the top into the chamber of cylinders e^4 through holes e^6 in guides e^7, secured in the tops of cylinders e^5. Screwed into the tops of cylinders e^4 are rods i, which slide freely through the top and bottom of cylinders e^5, and secured to their lower ends are beveled buttons i'. Hinged to the bottom of each of the cylinders e^5 by pins i^3 are a pair of tripping-dogs i^2, whose free ends are partly beveled to engage the bevel on the upper sides of buttons i'. In the bottom of cylinders e are placed cylindrical pieces j, having a continuation upward of steel cylindrical pieces j' screwed therein. The cylindrical pieces j' envelop the dogs i^2 and limit their outward motion.

i^4 are hardened-steel rings beveled at their top edges to conform to the outer bevel on the free ends of the dogs i^2. Surrounding the cylindrical pieces j are helical springs j^3, reacting at their lower ends upon flanges of pieces j and at their upper ends upon the bottoms of cylinders e^5. The springs j^3 have sufficient compression only to support the weight of the superposed parts and to restore them to the position shown in Fig. 1 after depression of these parts and adds no considerable amount to the sealing force of the apparatus. A series of much stiffer helical springs j^4 envelop cylinders e^5 and react at their lower ends on flanges formed on the bottoms of cylinders e^5 and at their tops upon the under sides of cylinders e^4. The springs j^4 are given original compression sufficient to compress the caps or crowns upon the bottles and no more and are held in the original compression by the contact of the dogs i^2 with the rings i^4 and the buttons i' or with the buttons i' only when the predetermined sealing-pressure has been reached, and the dogs i^2 are closed into position to pass down into rings i^4 by the beveled tops of said rings i^4. As, however, bottles of a given capacity vary in length, the parts just described are designed to release the sealing pressure as soon as the limiting compression of springs j^4 is reached. By the construction shown and just described it will be seen that with a bottle placed on the pad e^2 and forced upward by the cam b' until the sealing resistance becomes greater than the predetermined compression of the spring j^4 this spring begins to be slightly further

compressed, the button i' descends slightly from contact with the dogs i^2, causing them to be moved inward by the inclined top surface of the ring i^4 until they can pass down within the ring i^4, and the button i' holds spring j^4 under its original compression, while the bottle is released from all pressure, after which the resistance offered by the lighter spring j^3 restores the parts to the position shown in Fig. 1 while the whole is being dropped to its lower level by the cam b' preparatory to receiving another bottle. In this way the predetermined compressive force of spring j^4 can never be exceeded more than a very slight amount by a variation in the length of the bottles.

e^6 are thin sheet-metal sleeves secured at their upper ends to cylinders e^4 and freely enveloping the upper ends of cylinders e to protect the interior mechanism of the cylinders e and e^4 from any of the liquids being spilled about the machine entering the sliding joints of the one cylinder within the other.

e^{10} are holes bored in the tops of cylinders e^4 (shown in dotted lines only, Fig. 1) for the escape of and reëntrance of the air to and from the interior of the cylinders as the volume is changed by the sliding of cylinders e^4 within cylinder e, and for a similar purpose are holes e^{12} in the bottoms of cylinders e^5.

Secured by a flange at its lower end to the top of hollow column c is a hollow column c', threaded for a portion of its middle length.

k is a cylindrical piece fitting over the column c' and adjustably held in vertical position thereon by a nut k'. The nut k' is made in two pieces, so as to permit of its being placed in position shown, it having a groove formed in it which embraces a flange on the piece k. The piece k is made to revolve with column c' by means of a feather k^2, Fig. 3, upon which it slides when adjusted vertically on column c'. Secured to the piece k is a series of sealing-heads k^3, corresponding in number and position with the cylinders e and e^4.

Inserted in the lower ends of sealing-heads k^3 is a series of taper sealing-throats k^4, which effects the closing in of the corrugated flanges of the caps or crowns when forced up into them by the bottle-heads. Below the sealing-throats k^4 is a series of throat-rings k^5, open at their outer sides, as shown at Fig. 10, in plan and section, enlarged for clearness. The throats k^4 and throat-rings k^5 are secured in place by nuts k^6. In the upper part of sealing-heads k^3 is a series of plungers k^7, extending down into the sealing-throats k^4 and limited in their lower position by a flange formed thereon resting upon corresponding seats formed in the lower ends of the sealing-heads k^3. The rise of the plungers k^7 is resisted by springs k^8 reacting at their lower ends upon the flanges of the plungers k^7 and at their upper ends on nuts k^9. The function of plungers k^7 is, when the caps or crowns are inserted in the throat-rings k^5, to hold them in contact with the top of the bottle and exert a direct downward pressure to effect the compression of the sealing medium which the caps or crowns contain, while the throats k^4 compress their corrugated flanges around the bottle-heads. Surrounding and running in a groove formed in the lower ends of the sealing-heads k^3 is a flat ring k^{10}, whose inner edge meets the open sides of the throat-rings k^5. The ring k^{10} is made in two pieces and hinged on a post k^{11}, which is adjustably secured to a socket-standard by a set-screw t', said standard being secured at the bottom to the table h. The function of the post k^{11} is to assist in holding the ring k^{10} from rotating when in place and to support it when opened for removal of any obstruction in the throat-rings k^5. The function of the ring k^{10} when closed and in operative position is to confine the caps or crowns in the throat-rings as they are carried around to the sealing-point to meet the rising bottles. At that part of the ring k^{10} opposite the post k^{11} a channel s is cut partly in each half of the ring. Through this channel s the crowns or caps pass into the throat-rings k^5 as they pass by in the rotation of the sealing-heads k^3. The throat-rings occupying the bases of the sealing-heads are of the form shown in Figs. 10 and 15, each having a flaring mouth or entrance for the crowns. The bases of the sealing-heads, as shown in Fig. 15, are of such shape as to contact with each other, and a groove is made, Fig. 16, in the front for the reception of the ring k^{10}, so that the crowns are directed through the passage of the ring k^{10} to the throat-ring and there is no space between the throat-rings into which the crowns can pass. Fig. 17 is a section on line 17 17 of Fig. 15, showing the relation of the chute, the ring k^{10}, and the throat-ring.

m is a hopper into which the caps or crowns are indiscriminately placed. Its bottom is formed at an angle of about forty-five degrees and is secured to a channel-plate m^{15}. This channel-plate is secured to a bracket-piece m^2, which has a flanged socket on its lower end which embraces the upper end of column b and rests upon the piece k. The bracket-piece m^2 is prevented from rising off the column b by a nut m^5 and is held from rotating with the piece k by a key m^6, while allowing the piece k and beveled gear m^8, secured thereto, to freely revolve with the column c'.

All the parts carried by the piece k and bracket-piece m^2 accompany any vertical adjustment of the piece k for different sizes of bottles. Fitting over the upper end of piece k is a horizontal beveled gear m^8, secured to rotate therewith by a feather m^4. Upon a stud w run two beveled pinions m^7 m^8, secured together. The pinion m^7 engages the beveled gear m^3 and the pinion m^8 engages a beveled gear m^9, which rotates upon a stud m^{10} and presents on its upper side a plane surface to which is secured a selecting-ring m^{12} by means of the foot-pieces m^{11}. The up-

per surface of the selecting-ring m^{12} is beveled and is provided with a series of agitators or ribs m^{13}, and in its under side the selecting-ring m^{12} has channels o' of such dimension and form that the larger diameter of the crowns or caps o cannot pass through unless the larger or flanged side is toward the surface of the beveled gear-plate m^9, the channels o' being only wide enough for the passage of the smaller diameter of the caps or crowns o. In this way the caps or crowns o, lying indiscriminately upon the plate m^9, forming the bottom of the hopper and agitated by the rotation of the ribs m^{13}, will pass into the channels o' of the selecting-ring m^{12} from the inside if they present themselves with the flanges or larger diameters next the gear-plate m^9, but cannot pass if presented with the flange upward. Such of them, however, as fail to pass because presented wrong side up are tumbled and agitated by the ribs m^{13} until all finally find their way through the selecting-ring m^{12} by gravitation at its lower circumference, where the agitated caps or crowns will principally accumulate. Let into the upper surface of the channel-plate m', where it underlies the selecting-ring m^{12}, are switching-ribs o^2, slightly projecting above its surface. (Shown in plan, Fig. 5, and in elevation, Fig. 11.) These ribs engage the corrugations of the caps or crowns o and tend, as the selecting-ring m^{12} rotates over them, to cause the caps or crowns o to pass out beyond the periphery of the selecting-ring m^{12}. Secured to channel-plate m' is a switch-point o^3, which insures the passage of the crowns or caps out into the outer channel o^4 should the ribs o^2 fail to perform this duty. In occasional cases a cap or crown might arrive against the switch-point o^3 in such exact line with an approaching point of one of the triangular partitions between the transverse or angular channels of the selecting-ring m^{12} as to become crushed. To avoid this contingency is a spring o^5, carrying an upward projection o^6 on its free end, which protrudes upward through a slot in the channel-plate m'. This spring-point o^6 is so placed with reference to the switch-point o^3 and the approaching points of the triangular partitions of the selecting-ring m^{12} that a cap or crown which would otherwise be crushed against the switch-point o^3 will either be switched by the spring-point o^6 outwardly sufficient to avoid the crushing-line and insuring the operation of the switch-point o^3, so as to force the cap or crown into the outer channel o^4, or by receding below the channel-plate m' permit the cap or crown to be forced inward to rejoin the promiscuous mass of caps or crowns upon the gear-plate m^9. The spring-point o^6 also serves to switch inward any caps or crowns which may have partially entered the passages in the selecting-ring m^{12} wrong side up as far as their wrong position will permit again into the central mass of caps or crowns. The outer channel o^4 is curved upward and inward, as shown, respectively, at w', Figs. 5, 1, and 8, so that if any obstruction is offered to the passage of the caps or crowns on their way to or in the final channel or chute o^7—as, for example, by the selecting apparatus delivering more caps or crowns into the channel o^4 than are removed from the chute o^7 in the sealing operations—the line of caps or crowns will break inward and be discharged back through an opening p in the bottom of the hopper m under the partition n to rejoin the indiscriminate mass of caps or crowns lying upon the rotating gear-plate m^9, as shown at $t\,t$, Fig. 5.

The chute o^7 leads the caps or crowns to the channel s in the front of the ring k^{10}, whence they pass by the gravitation of the column in the chute o^7 into the throat-rings k^5 through the channel s. As the juxtaposed bottles are forced up into the throats k^4 they are successively sealed and again dropped, with the caps or crowns attached, as the cylinders e^4 descend. The sealed bottles as they are then carried around at the level of the table h are switched off the cylinders e^4 by the stationary switch h^5 to be further removed from table h by an attendant.

p' are openings in the side of the hopper m under the partition n to permit of access to the mass of caps or crowns lying upon the gear-plate m^9 and are closed by doors p^2 when in operation and latches operated by the knobs p^3.

p^4 is a bracket or brace secured at its upper end to the casting m^2 and at its lower end to the ring k^{10} when the latter is closed and the machine in operation, thus supporting the side of ring k^{10} opposite to the post k^{11}.

Fig. 8 is a side elevation of the hopper m and its attached mechanism, with the gear-cover V, Figs. 1 and 2, removed. The beveled gear m^3 is here shown in place also. Fig. 9 is a plan view of the retaining-ring k^{10}, showing the groove s where the lower end of the chute o^7 enters it and a throat-ring k^5 as it would arrive opposite the chute o^7 to receive a cap or crown. Fig. 10 is a plan and section of a throat-ring k^5 enlarged for clearness. In the three views, Fig. 6, of the selecting-ring m^{12} a cap or crown o is shown in full and dotted lines in various positions as passing through the passages o' of the selecting-ring m^{12}, and similarly in Fig. 5 the dotted circles o represent the caps or crowns after passing through the passages in selecting-ring m^{12} in a continuous line to the chute o^7, except, as shown at $t\,t$, Fig. 5, where their passage is obstructed.

The screw-thread upon the column c', the nut k', engaging the same, and the post k^{11}, sliding in the socket-standard k^{12}, as secured by the set-screw t', permit of the adjustment of the piece k, with its attached sealing-heads k^8 and the entire feeding mechanism, vertically to accommodate bottles of different volume and dimensions independently of the pressure-releasing mechanism described

above, which compensates only for slight variations in lengths of bottles of a given volume and supposedly given length.

The operator stands at the front of the machine and places the bottles upon the cylinders e^4 as they pass, which are centered by the gages e^3, and as they pass around to the back of the machine they are forced up into the throats k^4 by the cam b' until the predetermined limit of upward pressure is reached, when the pressure-releasing mechanism slightly drops them, after which the cam b' returns them to the original level and they are swept off upon the table h by the switch h^5, the feeding and selecting apparatus above automatically supplying the caps or crowns to the sealing mechanism.

To more clearly illustrate the path of travel of the crowns after they pass through the channels of the plate m' into the channel o^4, I have shown channel o^4 in enlarged view in Figs. 12 to 14. In Fig. 12 is shown a detail of a part of the upper edge of the selecting-ring m^{12} and the channel-plate m', together with that part of the hopper m having the opening p, through which the crowns pass back into the hopper when there is an obstruction for any reason. This figure shows the relative position of the channel o^4 to its adjacent parts, the section being taken on the line $x\,x$ of Fig. 13 just opposite the opening p. The inclination of this channel at its entrance is shown in the section Fig. 12^a, which is taken on the line $y\,y$ of Fig. 13. Fig. 13 shows the channel o^4 in plan view and not in its proper position, as this view is intended principally to show the shape of this channel, and Fig. 13^a is also a section on line $x\,x$ of this figure; but it will be understood that this sectional view does not show the plate in its proper relative position and is intended primarily to illustrate the configuration of the plate in section at this point.

Fig. 14 shows a cover-plate o^5 for the channel, this being in place in Fig. 12.

Fig. 12^a is a section on line $y\,y$ of Fig. 13, viewed in the direction of the arrow b and with the part in the position it occupies in the machine.

Fig. 13 is a plan view of the channel-piece o^4 as it would appear removed from the machine and resting on its flat base, Fig. 12 showing its relation in the machine.

Fig. 13^a is a section on line $x\,x$ of Fig. 13, viewed in the direction of the arrow a, the corresponding highest parts of Figs. 13 and 13^a being represented by Z^{10}. This figure represents the part as it would appear when resting on its flat base, Fig. 12 representing the same thing in its position in the machine.

Having thus described my invention, what I claim is—

1. A machine for applying closures to bottles, comprising a series of sealing-heads; means for automatically feeding crowns thereto; a series of bottle-supporting devices; means for rotating the heads and supporting devices and means for causing the bottle-supporting devices to approach and recede from the sealing-heads during their rotation whereby the crowns are automatically fed to the sealing-heads and the bottles carried by their supporting devices automatically raised to be sealed and lowered after sealing to be removed, substantially as described.

2. In a machine for applying closures to bottles, a series of sealing-heads; means for feeding crowns automatically to said heads, a series of bottle-supporting devices, means for rotating the heads and supporting devices; means for causing the bottle-supporting devices and sealing-heads to approach and recede during their mutual rotation, and means for removing the sealed bottles automatically from their supporting devices, substantially as described.

3. In a machine for applying closures to bottles, a series of sealing-heads; means for feeding crowns automatically to said heads, a series of bottle-supporting devices, means for rotating the heads and supporting devices, means for causing the bottle-supporting devices and sealing-heads to approach and recede during their mutual rotation, and means for removing the sealed bottles automatically from their supporting devices, comprising a fixed wiper h^5 extending into the path of the sealed bottles, substantially as described.

4. In a machine for applying closures to bottles, a pressure-limiting mechanism comprising a support for the bottle, a spring held under an original predetermined compression, a tripping mechanism and means for automatically operating the same when said predetermined pressure is reached, substantially as described.

5. In a pressure-limiting mechanism for bottle-sealing machines, a support for the bottle, a compound cylinder, a spring between the two members thereof, said spring being given an original predetermined compression and means substantially as described for releasing said compression when said predetermined limit has been reached, by allowing one member of said compound cylinder to slide within the other to shorten the same as a whole; substantially as described.

6. In a pressure-limiting mechanism for bottle-sealing machines, a bottle-support, a compound cylinder, a spring between the two members thereof held under a predetermined compression, a tripping device for automatically releasing said predetermined compression consisting of a pair of tripping-dogs pivoted to one member of said compound cylinder, and means carried by the other member of said compound cylinder for actuating the dogs, whereby said compound cylinder will become automatically shortened as a whole when the predetermined compression is reached and the pressure applied to the bottle resting thereon be automatically released, substantially as described.

7. In a machine for applying closures to bottles; a series of rotating compound cylinders, said cylinders comprising an upper inverted cylinder, supporting the bottles, a lower cylinder; a third cylinder sliding within said upper cylinder, a pair of tripping-dogs, a rod secured to the upper cylinder and carrying on its free end a button engaged by the tripping-dogs; a sleeve for the beveled button, limiting the outward motion of the dogs; a spring within the upper cylinder, said spring being given an original compression sufficient only to perform the sealing compression and a lighter spring to restore the parts after being tripped and the pressure released, substantially as described.

8. In a machine for automatically applying crown-closures to bottles, a series of sealing-heads, a hopper, a single chute between the hopper and the sealing-heads for supplying the heads in succession and means for properly feeding the crowns to the chute, substantially as described.

9. In a machine for automatically applying crown-closures to bottles, a series of sealing-heads, a hopper, a single chute between the hopper and sealing-heads and means for confining the crowns within the sealing-heads until attached to the bottle, substantially as described.

10. In a machine for automatically applying crown-closures to bottles, a series of rotating sealing-heads, a hopper, a single chute between the hopper and sealing-heads, and an encircling ring k^{10} for confining the crowns within the sealing-heads, substantially as described.

11. In a machine for automatically applying crown-closures to bottles, a series of sealing-heads, a hopper, a single chute between the hopper and the heads and an encircling ring k^{10} made in two parts hinged together, substantially as described.

12. In a machine for automatically applying crown-closures to bottles, a series of sealing-heads and compressing mechanism, a hopper to receive the crowns, an inclined rotating bottom plate, and a selecting-ring having a series of channels adapted to permit the passage of the crowns therethrough in a certain position; an outer channel-way surrounding said selecting-ring, and a single chute arranged to deliver said caps or crowns to the series of sealing-heads and compressing mechanism, substantially as described.

13. In a machine for automatically applying crown-closures to bottles, a hopper, a selecting-ring in the bottom thereof arranged in an inclined position and adapted to be rotated, and a series of channels extending through the selecting-ring adapted to permit the passage of the crowns when fed in proper position, agitators carried by the selecting-ring, and a plate n protecting the upper part of the selecting-ring from the mass of crowns in the hopper, substantially as described.

14. In combination with a hopper, a selecting-ring in the bottom thereof with channels therethrough for the passage of the crowns in proper position, a chute for directing the crowns to the sealing mechanism and a channel adapted to receive the crowns as they pass from the selecting-ring, said channel passing outside of the wall of the hopper and deviating from the plain circle of the selecting-ring and an opening in the wall of the hopper at the point of deviation whereby when obstruction is offered to the free movement of the crowns the surplus will be thrown back within the hopper through the said opening, substantially as described.

15. In a machine for automatically applying closures to bottles, a series of rotating, reciprocating and pressure-limiting supports for the bottles, a corresponding series of sealing-heads to operate upon said closures, a single feed-chute, an automatic selecting and feeding mechanism delivering said closures through said chute to said sealing-heads in proper juxtaposition with said bottles when placed indiscriminately in a hopper, substantially as described.

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

WILLIAM PAINTER.

Witnesses:
GEO. E. TAYLOR,
JOHN T. HAWKINS.