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Patented Jan. 8, 1901.

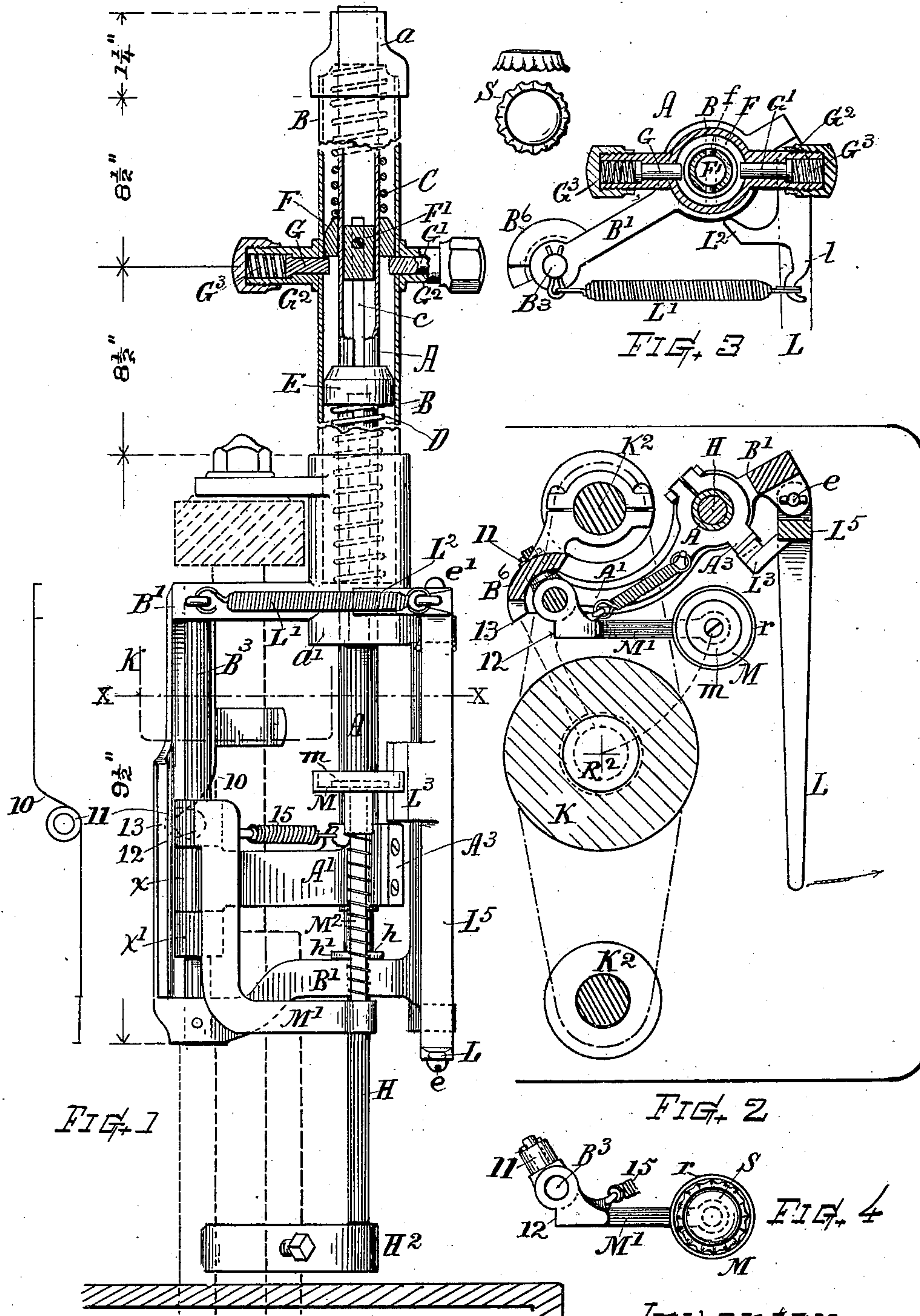
F. O. WOODLAND.

CROWN PLACER FOR BOTTLE FILLING AND STOPPERING MACHINES.

(Application filed Dec. 20, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.

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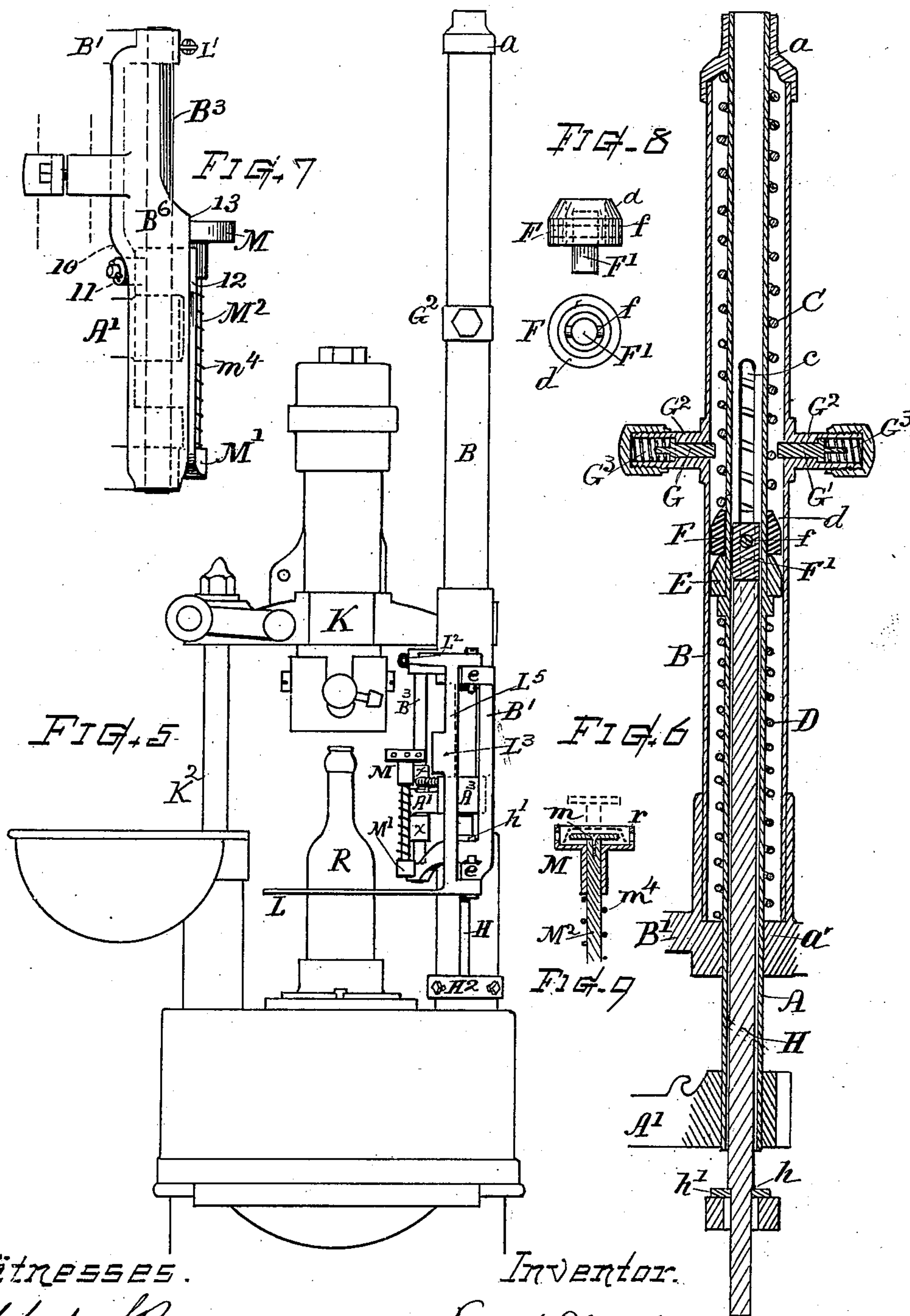
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(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

FRANK O. WOODLAND, OF WORCESTER, MASSACHUSETTS.

CROWN-PLACER FOR BOTTLE FILLING AND STOPPERING MACHINES.

SPECIFICATION forming part of Letters Patent No. 665,623, dated January 8, 1901.

Application filed December 20, 1899. Serial No. 740,983. (No model.)

To all whom it may concern:

Be it known that I, FRANK O. WOODLAND, a subject of the King of Sweden and Norway, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Crown-Placer for Bottle Filling and Stoppering Machines, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

This present invention consists in certain improvements and novel features of construction and combination more especially applicable for or relating to that class of mechanism an example of which is set forth in Letters Patent No. 637,316, heretofore granted me, the prime object of my present invention being to render the mechanism highly efficient, compact, convenient, and durable.

Another object is the combination of the mechanism in a manner for effecting the setting action of the superior power-spring co-incident with the downward movement of the stoppering-machine head.

Another object is to centralize the setting appliances and forces in relation to the power-springs and to afford a system of clutches or catch-dogs for said springs that will avoid cramping tendencies, give uniformity of strains and increased durability, and enable the mechanism to operate with ease and perfection of action.

Another object is to provide a mechanism for the purpose specified wherein the crown-carrier arm or device is arranged to reciprocate and swing upon a center or axis separate or distinct from the axis of the main reciprocating member and to dispose the carrier-tip in such relation as to facilitate the convenient handling thereto of the stoppers or crowns; also, to afford a structure and arrangement of the trip devices, stops, and other parts in such relation to the bottle filling and capping machine head as will render convenient their operations and will not interfere with the manipulation of the filling appliances on said machine.

I attain these objects by mechanism which is particularly explained in the following de-

tailed description and illustrated in the drawings, wherein—

Figure 1 is a front view, partly in section, representing a crown-placing mechanism embodying my invention. Fig. 2 is a horizontal section at line X X on Fig. 1, showing the arrangement of the crown-placing devices in connection with parts of a bottle filling and stoppering machine. Fig. 3 is a horizontal section at line Y on Fig. 1. Fig. 4 is a separate top view of the crown-carrier arm and its cam-roller. Fig. 5 is a side view, drawn to smaller scale, showing my improved mechanism in connection with the bottle filling and stoppering machine. Fig. 6 is a vertical central section of the operating devices and their tubular inclosing housing. Fig. 7 is a view of the side of the frame having the cam or directing surface thereon. Fig. 8 shows a side and plan view of the spring step-collar and its center block, and Fig. 9 is a vertical section of the holder-cup.

Referring to the parts of the mechanism as shown on the drawings, A denotes the endwise-reciprocating shaft or member, and B the upright inclosing cylinder or tubular housing, which is connected at its lower end with a frame B' for supporting the various operative parts. Said frame is provided with a suitable ear and clasp for attaching it to the head K and side rod K² of a crown bottle filling and stoppering machine.

Within the tubular housing B there is inclosed the power-springs C and D, with the spring step-collars and reciprocating member A, which latter consists of a tube arranged to slide endwise through bearings *a* at the top and bearing *a'* at the foot or frame hub, as indicated, the springs C and D being disposed in the annular space between the tubes to act in opposite directions and respectively seated against said bearings. The primary or inferior spring D is below and the secondary or superior spring C is above. The tubular reciprocating member A extends below the frame hub or bearing *a'* and is provided with a rigidly-attached laterally-projecting arm A', that connects with and lifts the crown-carrier devices, as hereinafter explained.

The frame tube or housing B is preferably made of seamless brass tubing, closely fit-

ting and firmly secured in the frame-hub. Its cap *a* fits closely around the reciprocating member and has an interior seating-face for the end of the spring C, which seats against the same and acts by downward expansion. The primary and reactive operations of the actuating-springs are substantially similar to that described in my prior Letters Patent, but the devices for controlling their action are of different and improved character from the prior employed devices.

E and F indicate the spring step-collars, both disposed between the springs C and D in the annular space between the tubular parts A and B and having the improved structure and operative arrangement shown. One of said collars E is fixed to the tube A or rests upon a flange fixed upon the tube A, so that the collar and tube will move together. The other, F, is arranged to slide on the reciprocating tubular member A, the tube being longitudinally slotted, as at *c*, for a distance somewhat greater than the length of the reciprocative motion. This upper or movable collar F is combined with a center block or core F', which runs inside the tube A, (see Figs. 6 and 8,) the collar and core parts being united by a pin *f*, that extends transversely through said parts and the said slot *c*. Said upper collar F serves as a foot-seat for the superior spring C, while the lower collar E or its sustaining-flange serves as a cap-seat for the inferior spring D. The upper part of each collar is made conoidal or beveled off around its outer top corner, as at *d*.

G and G' indicate two endwise-movable stop-bolts or catch-dogs arranged opposite each other in pockets or laterally-projecting guides G², fixed or formed on the housing-tube B perpendicular to its axis, and having screw caps or nuts on the outer ends thereof which inclose said catch-dogs and their presser-springs G³ in the manner shown. This structure permits the ready removal of the dogs when desired. Said catch-dogs are shouldered and fitted in reduced guide-openings, so that while normally pressed inward by their springs G³ their inward projection is limited at such a point that their ends will protrude into the interior chamber sufficiently to engage the collar, but not beyond the width of the beveled annulus thereon. Hence the square edge of the collar will be stopped upon the dogs, while the beveled edge of the collar will automatically press back or retract said dogs, permitting the collar to slide past the same. The dogs and collars are best made of hardened steel.

H indicates the compressing or power-setting rod, which I arrange within the interior of the reciprocating tube A, so that the said compressing-rod, the reciprocating member, operating-springs, clutch-collars, and inclosing or housing tube are all axially concentric in their relations. The top end of the compressing-rod impinges against the core-block

F', united with the collar F, and the lower end of said rod impinges against a detent or abutment H², fixed on the horn or stationary part of the bottling-machine frame, said rod projecting downward sufficiently far to give it full movement without interfering with the lower part of the guide-frame when the head K of the bottling-machine is depressed for capping the crown upon a bottle.

The lower portion of the compressing-rod H is preferably reduced in size, forming a shoulder *h*, that strikes upon a stop-washer *h'*, resting on the lower bar of the frame B', thereby forming a stop that prevents the rod from falling beyond a given limit of depression.

A centering and guiding rod B³ is disposed at suitable distance from but parallel with the tube A and supported at its top and bottom ends in the frame B', adjacent to the side upright B⁶ of said frame, which upright is fitted with a directing or cam surface 10. The crown-carrier arm M' is mounted to slide and swing on said guide-rod B³ by bearing-hubs *x* interengaging with the end *x'* of the reciprocator-arm A', which is also fitted to slide on said guide-rod 6 in such manner that the reciprocative movement of the member A is imparted to the crown-carrier arm M'. The bearing portions of the two arms are preferably made to interlock in the manner of a hinge on the rod B³ as a center axis.

The carrier-arm hub *x* is provided with a stud and antifriction-roller 11, that runs against the cam-surface 10 for imparting the necessary lateral swinging action to the carrier as it moves upward. A stop lug or surface 12 is provided on the arm M', that contacts with the edge 13 of the frame, and thereby limits the lateral forward swing of the carrier at the predetermined position.

A suitable spring 15 connects the arms A' and M' for drawing the carrier back to its primal position, as shown.

The carrier-arm is furnished with the upright crown-supporting pin or finger M², the upper end of which is provided with a crown-holder M, consisting of a circular plate *m* and a surrounding flat guard-cup having an upright circular rim *r*, into which the crown bottle-stopper S is handed face downward over the tip or plate *m*. The cup is arranged to slide freely on the pin M² and is normally held up to the plate by a light spring *m*⁴ in similar manner, as the crown-clutch device shown in my former Letters Patent.

The cam-surface 10 controls the carrier-arm on the upward movement; but on the downward movement the roller-stud 11 does not necessarily follow the face of the cam, but is free to come down, more or less, away from the cam-face, the spring 15 causing the carrier to return to proper starting position. Hence there is no jam or hammering of the roller-stud and cam occasioned by the quick reactive movement which is imparted

by the force of the superior actuating-spring C; but the carrier-arm can swing backward during or after its downward movement.

L indicates the throw-off or trip-lever, which is integrally attached to an upright rocker-bar L^5 , having hinging connection at its top and bottom ends with the frame B' by suitable pivots at e and e' . At an intermediate position on the bar L^5 there is a projecting-detent L^3 , that swings over a counterpoised detent A^3 , formed on the hub of the lifting-arm A' . The contact-faces of the detents are best fitted with hardened-steel plates.

The faces of the clutch-detents L^3 and A^3 are best made of sufficient vertical length to prevent their running entirely past each other at the upward movement of the shaft A. Hence said detents cannot become locked except at their proper position.

At its upper end the bar L^5 is provided with a stop lug or finger L^2 , that strikes the frame, and an arm or lug from which a spring L' is strained for returning the trip devices to normal position. This construction of the trip and throw-off devices affords a strong firmly-supported lock, but one easily operated and quick and steady in its action when returning to place, while the parts stand well back and out of the way from contact in the general operation of the machine, except the throw-off lever L, which is ready of action as the bottle is brought against it.

In the operation the setting of the reacting or superior spring is effected by the downward movement of the head K in the following-described manner: The compressing-rod H is held by the step H^2 against any depression of said rod, and the impingement thereof against the core F' as the parts descend consequently offering resistance to the collar F and causing the closure of the spring C until the catch-dogs G G' pass beneath the collar. Then as the head K rises, carrying the parts upward from the end of the rod H, the dogs retain the spring C in compressed relation, while the inferior spring is retained in compressed relation by the engagement of the stop-detents A^3 and L^3 of the trip mechanism. The operator hands a crown-stopper into the holder or cup M while waiting for the bottle, previously placed in the head, to become filled. When the mechanism is to be tripped, an outward swing of the lever L (which in practice is effected by removing a bottle) rocks the bar L^5 and lets off the detent L^3 from A^3 . The spring D instantly throws up the tube A, elevating the arm A' , which lifts the crown-carrier arm M' along its guide B^3 . The cam-surface 10 and roller-stud 11 cause the crown-carrier to swing forward, bringing the crown-holder cup to the position indicated by dotted lines R^2 beneath the capping-machine throat, into which the carrier-finger tip m , with the bottle-stopper crown thereon, is subsequently inserted by the further upward movement of the arms, impelled by the action of the spring D. The stop-surface 12, by contact with the

frame edge 13, arrests the motion of the swinging parts, so as to prevent the carrier-finger and cup passing laterally beyond the given point or axis of the machine-throat into which the finger is to be elevated. When the spring D has elevated the parts almost to the desired limit, the beveled end of the collar E runs between the dogs G and G' , forcing them outward, and thereby releasing the collar F as the two collars are brought together. This releases the superior spring C, which acts by its downward expansion and by its superior force immediately depresses the reciprocating member A, arm A' , and carrier devices, returning them to their first position. The downward throw of said spring C is arrested by the center block F' of collar F striking the end of the compressing-rod H, which stands upon the step H^2 . This stopping of the spring C relieves the parts from downward spring-pressure, and any further downward movement and momentum of the shaft A and carrier devices is yieldingly arrested by cushioning action upon the primary spring D, the weight of the moving parts being transferred to and borne by said spring D. When the shaft A is at depressed position, the detent L^3 swings over the detent A^3 , interlocking therewith for retaining the spring D in set condition until the trip-lever L is again swung outward.

What I claim herein, and desire to secure by Letters Patent, is—

1. In a crown-placing mechanism for the purpose specified, in combination with a reciprocating actuating rod or member and means for operating the same; a crown-carrier device mounted to have swinging and vertical movement, a centering-guide therefor separate from said actuating-rod, and a lifting-arm operatively connecting said crown-carrier device and actuating-rod, substantially as set forth.

2. In a crown-placing mechanism, for the purpose specified, the combination of a suitable supporting-frame, a reciprocating shaft or member having a laterally-projecting lifter-arm fixed thereon, a vertically-movable laterally-swinging crown-carrier arm, a guide on which said arm is slidably mounted separate from and parallel to said reciprocating shaft, said carrier-arm having the crown-holding device and inserting-finger thereon, and operatively connected with said lifter-arm, means adjacent to said guide for imparting swing movement to the carrier-arm, means for reciprocatively actuating said shaft, and an engaging stop and trip for controlling the action.

3. In a crown-placing mechanism, the combination, of a frame adapted for attachment to the bottling-machine head, a tubular housing-guide supported thereon, an endwise-reciprocative tube arranged through bearings at the ends of said housing, differential power-springs about said tube, two spring step-collars between the springs, one collar

having connection with said tube, the other sliding thereon and connected through a slot with a core or center block within the tube, the centrally-disposed compressing-rod, its end impinging on said center block, a stationary step for said rod, inwardly-projected catch-dogs for engaging said collars, a latch and let-off trip for controlling the prime action, and crown-carrier devices actuated by said reciprocating tube.

4. In a mechanism for the purpose specified, the tubular supporting-housing provided with end bearings, the tubular reciprocating shaft or member, the differential actuating-springs, the beveled spring step-collars, and the central compressing-rod, all disposed axially concentric; in combination with the oppositely-disposed catch-dogs for engaging the spring step-collar, interlocking stop-detents for retaining said shaft, and a trip device for throwing off said detents.

5. In a crown-placing mechanism, comprising a system of oppositely-acting power-springs, a reciprocating member and crown-placing carrier actuated thereby; the combination of a tubular housing having end bearings adapted as guides for the reciprocating member and seats for the power-springs, said housing-tube provided with laterally-projecting screw-capped pocket-arms disposed thereon perpendicular to the axis, inwardly-acting catch-dogs fitted with limiting-shoulders, and presser-springs for said dogs confined within the pockets, said housing-tube and pockets adapted for completely inclosing the springs, spring step-collars and catch-dogs, substantially as set forth.

6. In a mechanism of the character described, the combination with the inclosing housing, the reciprocating carrier-actuating rod or tube, the upwardly-expanding spring, and the downwardly-expanding spring arranged on said tube, of two spring step-collars between said springs, one operatively connected to said tube, each collar formed with a square end and a beveled end, and the inwardly-projecting catch-dogs and presser-springs therefor inclosed in the laterally-projecting screw-capped guides fixed on said inclosing tube.

7. The combination with a bottle-capping-machine head operating with ascending and descending movement; crown-placing mechanism supported upon said machine-head and comprising a crown-placing carrier, carrier-operating members and actuating-springs, the superior spring having a movable foot-support, and retaining-catch devices therefor; of an endwise-impinging compressing rod or member beneath the foot of said superior spring, and an abutment-step having means for its stationary attachment to the horn of the capping-machine, the foot of said compressing member impinging against said abutment-step; thereby affording upward resistance for compressing said spring by and

during the descending movement of the capping-machine head.

8. The combination, with the machine-head for capping crowns upon bottles, of a swinging crown-placing carrier, an upright guide-rod whereon said carrier is mounted to swing and slide, a frame-bar adjacent to said guide-rod having a cam or directing surface formed thereon, a roller-stud fixed to said carrier and running on said cam-surface, a reciprocating or lifter arm connecting with said carrier, a carrier-returning spring, and means for imparting motion to said lifter-arm, substantially as set forth.

9. The combination substantially as set forth, of the frame provided with the inclosing housing, and the reciprocating tube mounted for endwise movement in said housing, a supplemental carrier centering and guide rod, a lifting-arm carried on said reciprocating tube, its outer end sliding on said guide-rod; means for effecting and controlling the reciprocative action of said tube and lifting-arm, a crown-carrier arm mounted on said supplemental guide-rod and engaging said lifter, a crown-supporting finger at the end of said arm, a cam-surface and roller-stud for swinging said crown-carrier arm to bring its finger beneath the capping-head.

10. In a mechanism for the purpose set forth, the combination with the bottling-machine head for capping crown-stoppers on bottles, and a carrier-actuating mechanism, its frame, and a carrier-directing guide; of a vertically-moving, laterally-swinging crown-carrier provided with means, as a stop lug or surface 12 and counter-surface 13, for arresting or limiting the swing of said crown-carrier when its crown-holding finger is at forward position, and then permitting upward movement thereof for insertion of the crown into the capping-head.

11. In a spring-actuated crown-placer mechanism having a swinging crown-carrier arm and a crown-placing finger thereon, said arm endwise reciprocative upon an axially-disposed guide; the combination with said arm, and its actuating mechanism; of a return-spring, a roller-stud carried on said arm, and a directing cam-surface for imparting swinging action to the carrier-arm, said parts adapted to give positive swing of the arm on its upward movement, but permitting release from the cam action on the downward or retractive movement, for the purposes set forth.

12. The trip device comprising an upright pivotally-supported rocker-bar having the forwardly-projecting lever at its lower end, a stop-finger at its upper end and an intermediate projecting detent L^3 ; in combination with the reciprocating members having the lifting-arm A' and detent A^3 fixed thereon, the crown-carrier operated by said arm, means for actuating said reciprocating member, and the trip return-spring, substantially as set forth.

13. In a crown-placing mechanism adapted for attachment to the reciprocating head of a bottle-stoppering machine; the combination with the housing-support frame, reciprocating tube, actuating-springs, spring step-collars and catch-dogs, of a compress-rod extending up within the tube, and having its lower portion of reduced diameter forming a shoulder *h*, and a collar-washer *h'* surrounding said rod and seated on the frame, for the purpose set forth.

14. In a crown-placing mechanism for the purpose specified; the combination with the reciprocating member, its actuating means, the crown-carrier devices, the lifter connections therefor, and the trip-lever rocker-bar; of the interlocking latch lugs or detents having hardened-steel abutting faces, the combined length of which faces exceeds the length of movement of the reciprocating parts,

whereby said detents are rendered non-engageable except at the position of greatest depression of the carrier and carrier-actuating mechanism.

15. In a crown-placing mechanism for the purpose specified, the crown-holding device or carrier-cup consisting of a circular upright peripheral guard-rim and a central perforated hub rigidly connected with said rim; in combination with the finger-rod having the tip end plate thereon, and the yielding spring beneath said cup, substantially as set forth.

Witness my hand this 6th day of December, 1899.

FRANK O. WOODLAND.

Witnesses:

CHAS. H. BURLEIGH,
ELLA P. BLENUS.