(No Model.) 4 Sheets—Sheet 1.

R. BRASS.

MACHINE FOR SEALING BOTTLES.

No. 563,552. Patented July 7, 1896.

Fig. 1.

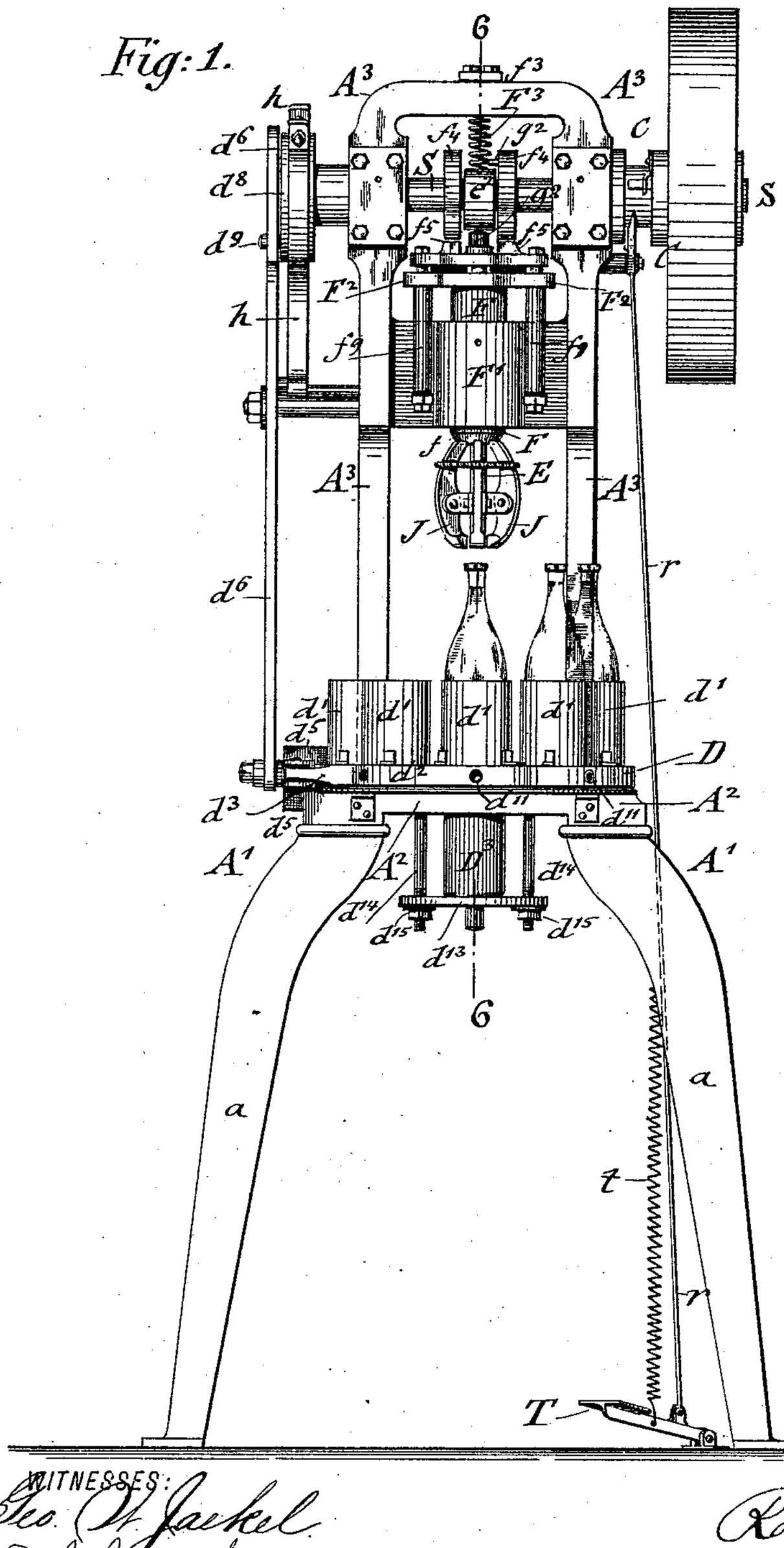

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Fig: 2.

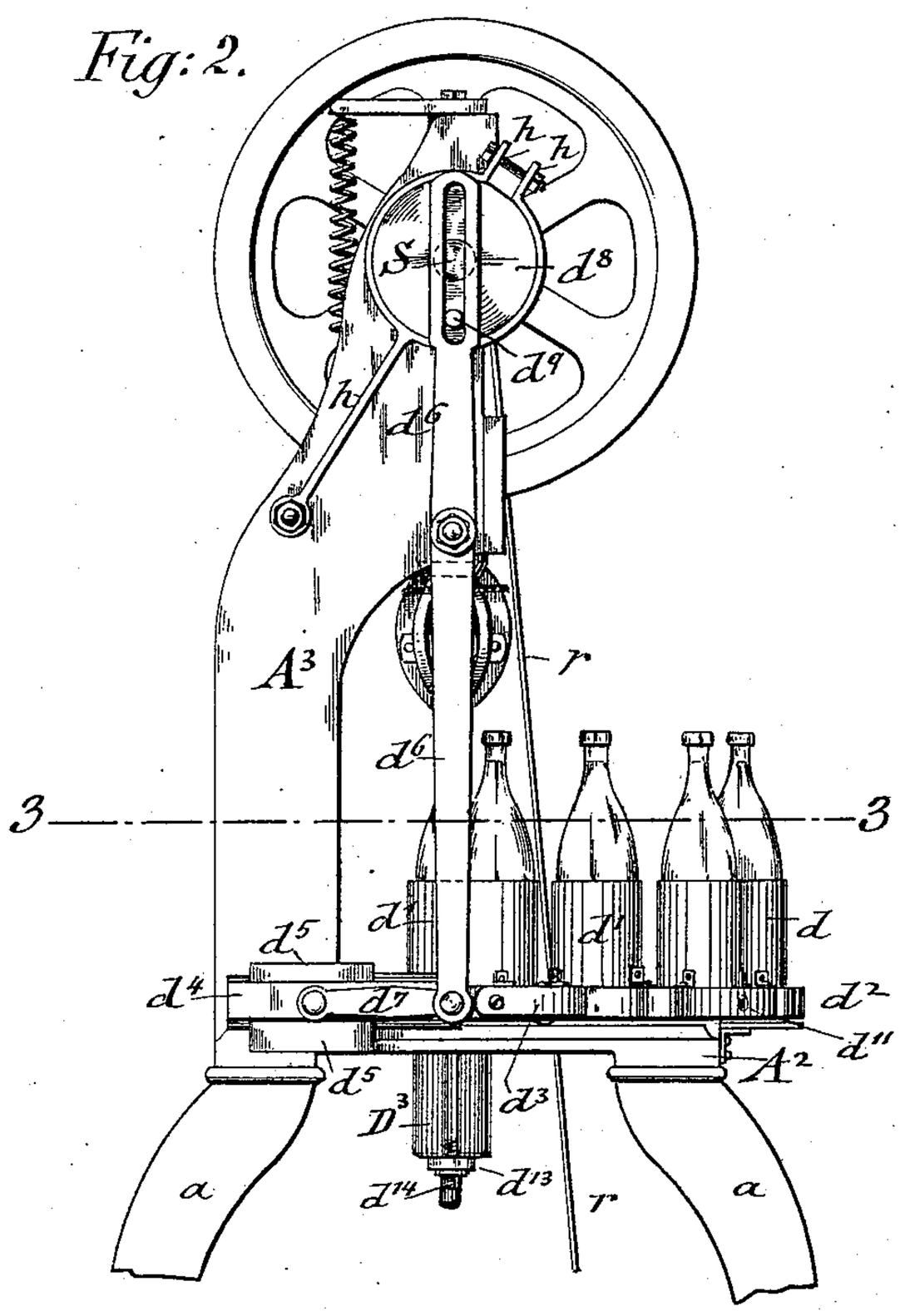
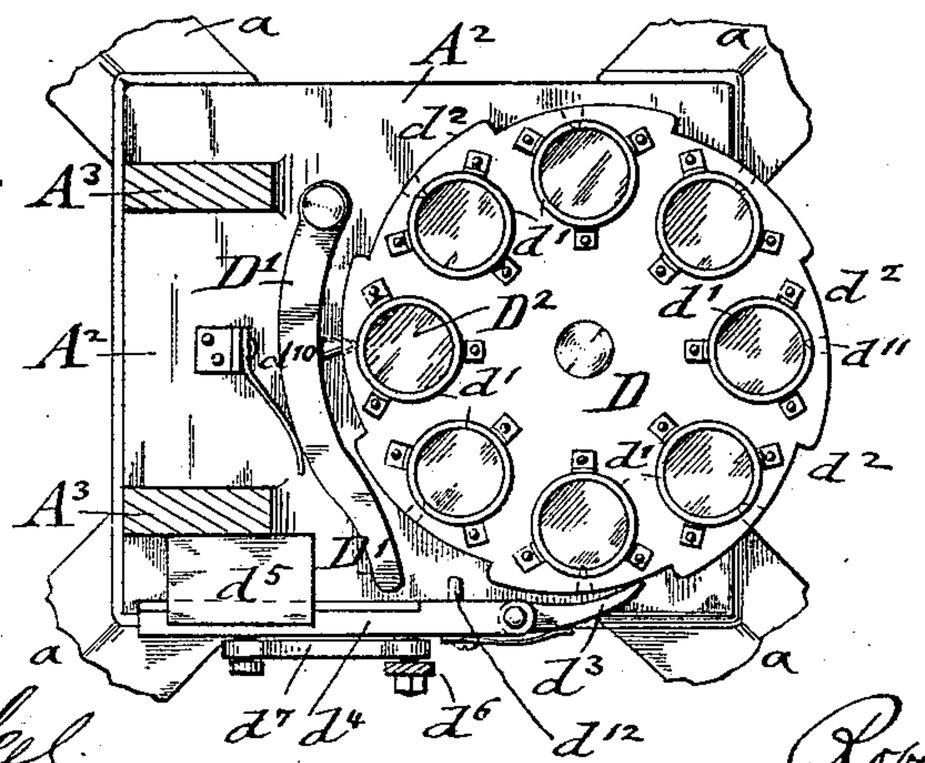


Fig: 3.



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MACHINE FOR SEALING BOTTLES.

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Fig: 4.

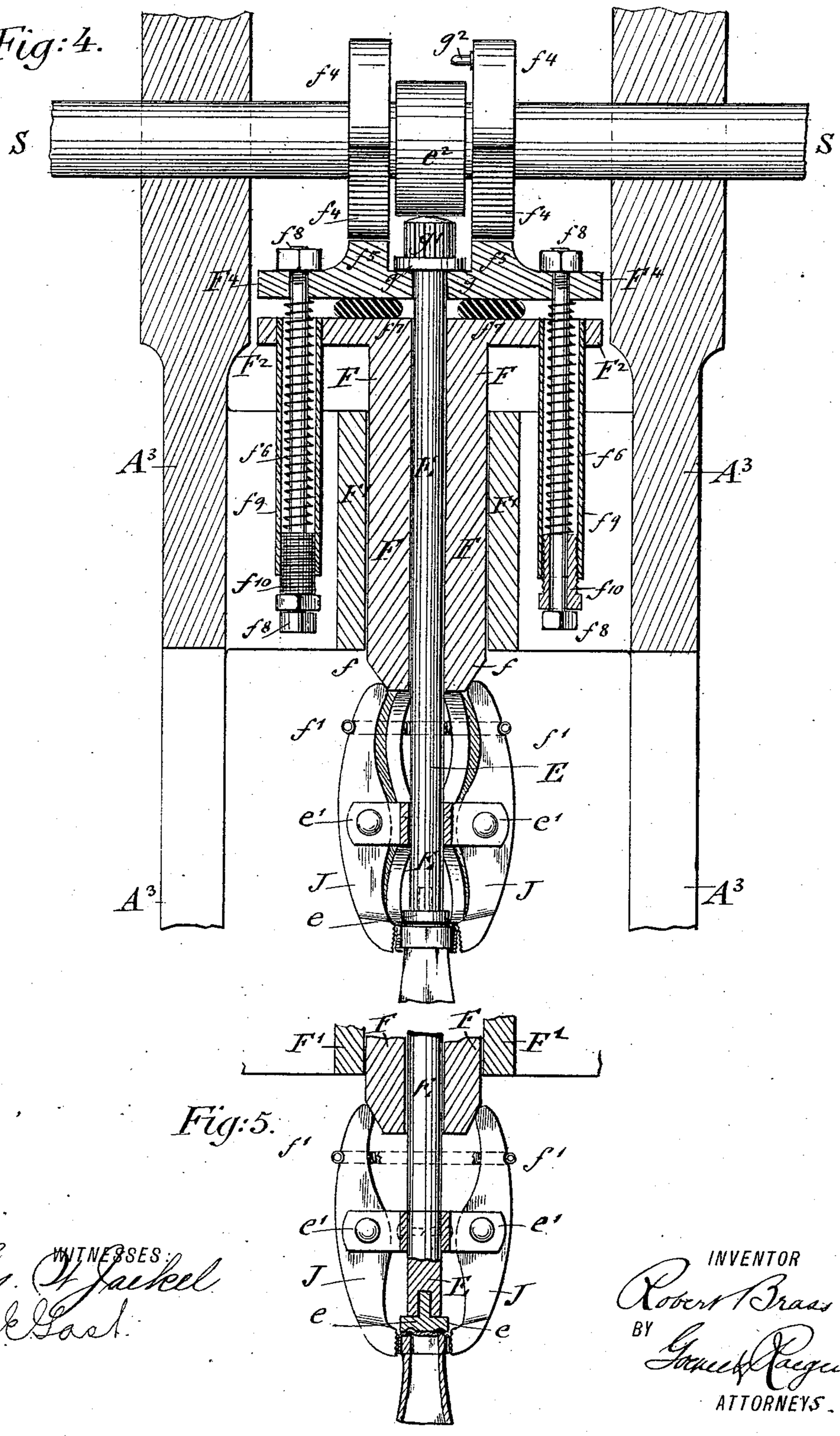

Fig: 5.

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MACHINE FOR SEALING BOTTLES.

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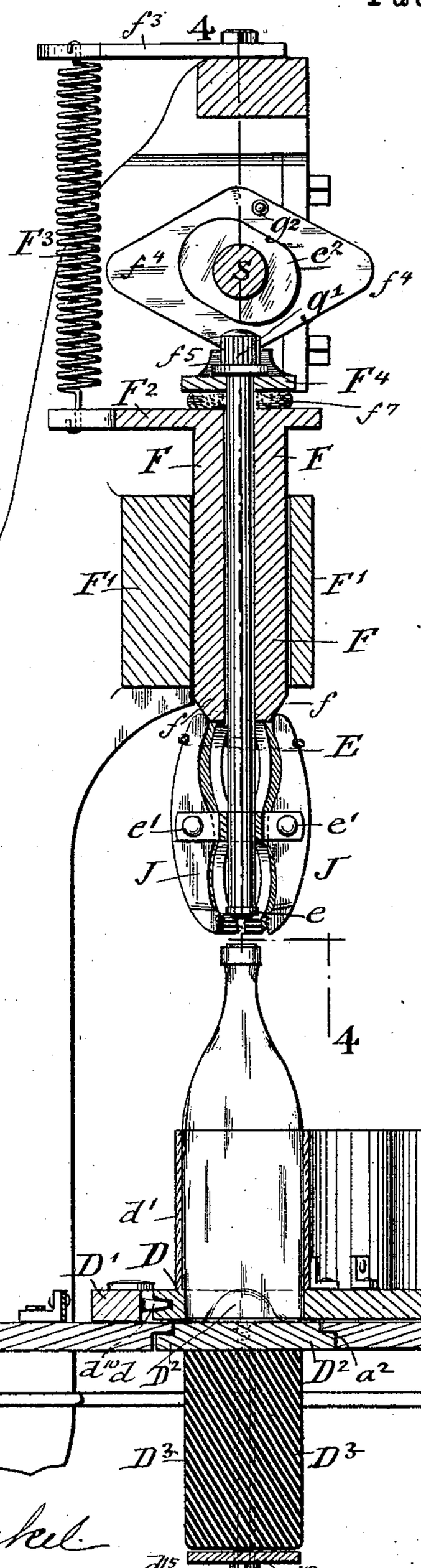
Fig: 6.



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UNITED STATES PATENT OFFICE.

ROBERT BRASS, OF BROOKLYN, NEW YORK, ASSIGNOR TO JOHN BOYLE, OF SAME PLACE.

MACHINE FOR SEALING BOTTLES.

SPECIFICATION forming part of Letters Patent No. 563,552, dated July 7, 1896.

Application filed November 23, 1895. Serial No. 569,959. (No model.)

To all whom it may concern:

Be it known that I, ROBERT BRASS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Machines for Sealing Bottles, of which the following is a specification.

This invention relates to an improved machine for sealing bottles with sheet-metal caps in such a manner that the tight and uniform closing of the cap around the rim of the bottle-mouth is obtained without subjecting the metal to undue strains or breakage; and the invention consists of a machine for sealing bottles which comprises a vertically-reciprocating spindle, a group of compressing-jaws fulcrumed to the lower end of the spindle, a vertically-reciprocating and spring-cushioned sleeve having a conical lower end acting on the upper ends of the jaws, means for actuating the jaws twice during each rotation of the motion-transmitting cam-shaft, and means for imparting a partial rotation between the two successive actuations of the jaws, so that two successive closing pressures are exerted on the rim of the sheet-metal closing-cap of the bottle.

The invention consists, further, of the combination of a vertically-reciprocating spindle, a group of compressing-jaws fulcrumed to its lower end, and a vertically-reciprocating and spring-cushioned sleeve provided with a conical lower end to act on the upper ends of the compressing-jaws.

The invention consists, further, of the combination, with the spindle and compressing-jaws, of an intermittently-rotating platform provided with a number of bottle-holders, a spring-cushioned block located below said platform and vertically below the actuating spindle and jaws, so as to form an elastic cushion for the bottle, and means for locking the platform in position for the action of the closing mechanism.

The invention consists, further, of certain details of construction, which will be fully described hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of my improved machine for sealing bottles with sheet-metal bottle-caps. Fig. 2 is a side elevation of the same. Fig. 3 is a horizontal section on line 3 3, Fig. 2. Fig. 4 is a vertical central section on line 4 4, Fig. 6, through the spindle and jaw operating sleeve, drawn on a larger scale and showing the parts in position before closing the bottle-cap. Fig. 5 is a detail section showing the compressing-jaws in position for closing the cap to the bottle-mouth; and Fig. 6 is a vertical central section on line 6 6, Fig. 1, also on a larger scale.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A′ A^3 represent the supporting-frame of my improved machine for sealing bottles with sheet-metal caps, which frame is composed of a lower part A′, having a bed-plate A^2, which is supported by strong legs *a a*, and of two standards A^3, that extend from the bed-plate in upward direction and are provided at their upper ends with journal-bearings for the cam-shaft S. The cam-shaft S receives rotary motion by a belt-and-pulley transmission from a suitable power-shaft. A treadle T is arranged at the lower front part of the supporting-frame and connected by a helical spring *t* with the frame A and by a suitable rod *r* with a clutch C on the cam-shaft S, the members of the clutch being placed in mesh when the treadle is depressed, so as to transmit power to the cam-shaft, and separated from each other when the treadle is released, so that the working of the machine is interrupted. To the bed-plate A^2 is centrally pivoted a disk-shaped platform D, which is provided with a number of circular openings *d* and with sheet-metal bottle-holding sockets *d′*, attached to the platform, said bottle-holders extending around said openings and serving to receive the bottles to be sealed. The platform D is provided at its circumference with as many teeth d^2 as there are openings and bottle-holders, which teeth are engaged by a spring-actuated pawl d^3, which is applied to the front end of a horizontally-guided slide d^4, that is guided in ways d^5, attached to the bed-plate A^2, as shown in Figs. 2 and 3. The slide d^4 is connected by a pivot-link d^7 with a fulcrumed lever d^6, the upper slotted end of which is engaged by a

crank-pin d^9 of a crank-disk d^8, so as to impart at each rotation of the cam-shaft a forwardly and backwardly reciprocation to the pawl-carrying slide d^4, so as to turn thereby the bottle-holding platform around its pivot for a certain distance in proportion to the number of bottle-holders arranged on the same. As soon as the platform is turned by the pawl to the required extent a spring-actuated locking-lever D′ engages by a pin d^{10} a socket-hole d^{11}, arranged in each tooth at the circumference of the platform D, so as to lock the platform and hold the bottle which is then in position below the closing devices firmly in position. During the return motion of the pawl-carrying slide d^4 the outer end of the lever D′ is engaged by a lug d^{12} on the slide, so that the locking-pin d^{10} is withdrawn from the socket-hole d^{11} and thereby the bottle-holding platform released, so as to be ready for the next forward motion of the pawl. By the intermittent motion imparted to the platform by the pawl-and-ratchet device d^2 d^3 one bottle after the other on the platform is placed vertically below the closing devices, so that the sheet-metal bottle-cap placed on the mouth of the bottle can be subjected to the action of the closing devices.

The closing devices consist of a central spindle E, a series of compressing-jaws J, fulcrumed to the lower end of the spindle, and a sleeve F, which latter is provided with a conically-tapering lower end f. To the lower end of the spindle F is applied a heading-block e, the shape of which corresponds to the shape of the bottle-closing cap. Above said heading-block is arranged a spider which forms lugs e', to which is fulcrumed the series or group of compressing-jaws J, the upper ends of which are pressed against the conical lower end f of the sleeve F by a coil-spring f', that extends around the upper ends of the jaws. The lower ends of the jaws are concaved, so as to correspond in shape to a portion of the rim of the bottle-head. In the drawings six jaws are shown as grouped around the spindle, but it is obvious that a larger or smaller number of jaws can be arranged. It is preferable, however, to use more than four jaws, so that the jaws surround the entire circumference of the bottle-cap and act in the nature of grippers on the same. The concaved faces of the jaws may be smooth, grooved, or toothed, so as to firmly grip the rim of the sheet-metal bottle-cap when pressing the same on the rim of the bottle-head. The sleeve F is guided in a stationary cylindrical portion F′, which is supported by the standards A^3 of the supporting-frame. The sleeve F is provided at its upper end with an extension F^2, to which is applied a strong helical spring F^3, that is suspended from a stationary lug f^3 at the upper part of the supporting-standard, said spring acting in the nature of a lifting-spring on the sleeve F. A downward motion is imparted to the sleeve F by two double cams f^4 on the driving-shaft S, which cams act on a spring-cushioned plate F^4, that is arranged above the upper end of the sleeve F, said plate being provided with raised bosses f^5 for the cams. The plate F^4 extends loosely around the upper end of the spindle and is spring-cushioned by helical springs f^6 or by rubber blocks f^7, or both. In the drawings the cushioning-springs f^6 are arranged on hanger-rods f^8, which are suspended from the plate F^4 and which are inclosed by sheet-metal housings f^9, supported by the extension F^2 at the upper end of the sleeve F, the tension of the springs being adjusted by means of screws f^{10} at the lower ends of the housings, as shown in Figs. 1 and 4. The cushioning-springs of the plate F^4 are arranged for the purpose of permitting the yielding of the compressing-jaws and sleeve in case the bottle-heads are of varying sizes, so that the jaws and sleeve can "give" sufficiently for preventing the crushing of the bottle-neck, which would be the case under the positive motion imparted to the jaws if the cushioning of the sleeve were not provided for. The cushioning-springs f^7 act, therefore, in the nature of a protecting device for the bottles, so as to permit the proper compressing motion of the jaws but prevent the crushing action of the same on the bottle-heads.

Between the two double cams f^4 on the cam-shaft S is arranged a third double cam e^2, which acts on the upper end of the spindle E, and presses the same downward with the jaws, so that the latter are in position ready to be acted on by the conical lower end of the sleeve F. By the downward motion imparted to the spindle the heading-block e is pressed on the cap placed on the head of the bottle until the head is in its proper position to the lower ends of the compressing-jaws. The motion of the spindle is followed up by the downward motion of the sleeve imparted by the cams f^4, so that the compressing-jaws are actuated by the lower conical end of the sleeve and the flange of the sheet-metal cap pressed tightly around the exterior rim of the bottle-head. As soon as the pressure of the cams f^4 on the sleeve F is released, it is raised by the suspension-spring F^3, so that the jaws are opened again by the action of the coil-spring f', which extends around the upper ends of the same, as shown in Figs. 1, 4, and 6. The coil-spring f' holds the upper rounded-off ends of the jaws in contact with the conical lower end of the sleeve F, the spring being expanded when the upper ends of the jaws are moved outwardly by the lower conical end of the sleeve, while the lower ends of the jaws are moved inwardly for pressing the bottle-cap tightly on the rim of the bottle-head.

The upper end of the spindle E is provided with a collar g, which rests on the plate F^4, and carries a pinion g', which is provided with twice the number of teeth and recesses as the number of jaws arranged at the lower end of the spindle. One of the double cams f^4 is provided with a tooth g^2, which enters into one of the recesses of the pinion g' at each full rota-

tion of the cam-shaft S, so as to impart an axially-rotating motion to the spindle and the jaws, shift the latter on the rim of the bottle-cap, and bring them into a second position on the circumference of the bottle-cap. By the action of the opposite ends of the double cams f^4 on the jaws a second compressing action is exerted by the jaws on the rim of the bottle-cap and thereby the tight closing of the same produced, especially as thereby the portions of the flange of the cap between the jaws are pressed by the second action of the jaws on the rim of the head. This is a very important feature of my bottle-sealing machine, as thereby the cap is pressed firmly and reliably around its entire circumference of the rim of the bottle-head.

A brake-band h is arranged around the crank-disk d^8 at the end of the cam-shaft S. This brake device retards to a certain extent the upward motion of the sleeve F and prevents the too quick or jerky return motion of the sleeve under the influence of its spring F^3.

Below the intermittently-rotating platform D is arranged in the bed-plate A^2 a spring-cushioned and shouldered follower-block D^2, which fits into an opening a^2 of the bed-plate A^2. The center of the opening is in line with the axis of the spindle E, so that when one of the bottle-holders is placed with a bottle over the follower-block D^2 it is supported on said block. In case, therefore, any bottle should be of more than normal height it can give in downward direction under the pressure of the spindle when the latter and the jaws are actuated for applying the cap to the bottle-head, so that the crushing of the bottle by the downward pressure of the spindle is prevented by the lowering of the follower-block. The follower-block D^2 is cushioned either by an elastic sleeve or by a helical spring D^3, which is supported on a strap d^{13}, suspended by hanger-rods d^{14} from the bed-plate, the tension of the sleeve or spring being adjusted by means of screw-nuts d^{15} in the usual manner. This spring-cushioned follower-block acts in the nature of a protecting device against the crushing of the bottle when under vertical downward pressure, while the yielding motion of the jaws and sleeve in upward direction serves to prevent the crushing of the head of the bottle under the inward pressure of the jaws.

The machine is intended for sealing bottles by means of sheet-metal caps having a suitable lining of paper or other material at their inner surfaces. The sealing of these caps to the heads of the bottles is accomplished in an effective and reliable manner, one bottle being sealed at every partial rotation of the bottle-holding platform and at each full rotation of the cam-shaft.

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

1. The combination, of a rotatable reciprocating spindle, a series of compressing-jaws supported by the lower end of the same, a spring-actuated reciprocating sleeve for actuating the compressing-jaws, and means for partially rotating the spindle and the series of compressing-jaws around their axis between two successive actuations of the jaws, substantially as set forth.

2. The combination, of a cam-shaft, a spring-cushioned spindle, cams on said shaft for reciprocating said spindle, a spring-actuated sleeve surrounding the spindle and having a conical lower end, a series of compressing-jaws fulcrumed to the lower end of said spindle, cams on the cam-shaft for reciprocating said sleeve, twice in succession to actuate the jaws twice in succession, and means for turning the spindle between said two successive actuations of the jaws, substantially as set forth.

3. The combination, with a reciprocating spindle having a heading-block at its lower end, of a series of compressing-jaws arranged at the lower end of the spindle, of a reciprocating and spring-cushioned sleeve having a conical lower end to act on said jaws, a cam-shaft, means for lowering the sleeve twice during each rotation of the cam-shaft so as to impart two compressing movements of the jaws for each rotation of the cam-shaft, and means for imparting an axially-rotating motion to the spindle and the jaws between the successive actuations of jaws, substantially as set forth.

4. The combination of a spindle having a heading-block at its lower end, a series of compressing-jaws fulcrumed to said lower end above the heading-block and provided with a tension-spring acting on the upper ends, means for imparting reciprocating motion to said spindle, a spring-actuated sleeve guided on said spindle and having a conical lower end for actuating said jaws, means for reciprocating said sleeve, a plate above the upper end of the sleeve, and cushioning-springs interposed between said plate and the upper end of the sleeve so as to impart a yielding motion to the compressing-jaws, substantially as set forth.

5. The combination, with a reciprocating spindle provided with a series of fulcrumed and spring-actuated jaws, a reciprocating and spring-cushioned sleeve having a conical lower end, an intermittently-rotating platform provided with bottle-holders, a follower-block in the bed-plate below the platform, a hanger supported from the frame of the machine, an expansion-spring interposed between the hanger and said follower-block and means for locking the bottle-holding platform, substantially as set forth.

6. The combination of a bed-plate having an opening, a follower-block arranged in said opening, an upwardly-acting spring bearing against said block, means for preventing the movement of said block above the bed-plate, a centrally-pivoted platform provided with a concentric series of openings, bottle-holders

extending around said openings, means for imparting intermittent rotary motion to said platform, and means for locking the platform in position when one of the openings of the platform is in register with the opening of the bed-plate, substantially as set forth.

7. In a machine for sealing bottles, the combination of a reciprocating spindle, a series of fulcrumed compressing-jaws applied to the lower end of said spindle, a reciprocating and spring-cushioned sleeve having a conical lower end and acting on said compressing-jaws, a cam-shaft, double cams for imparting two actuations to the jaws for each rotation of the cam-shaft, and means consisting of a recessed pinion at the upper end of said spindle, and a pin on one of the cams on the cam-shaft for imparting a partial rotation to the spindle between the actuations of the jaws so as to produce two separate compressions of the bottle-cap, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ROBERT BRASS.

Witnesses:
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