

No. 673,569.

Patented May 7, 1901.

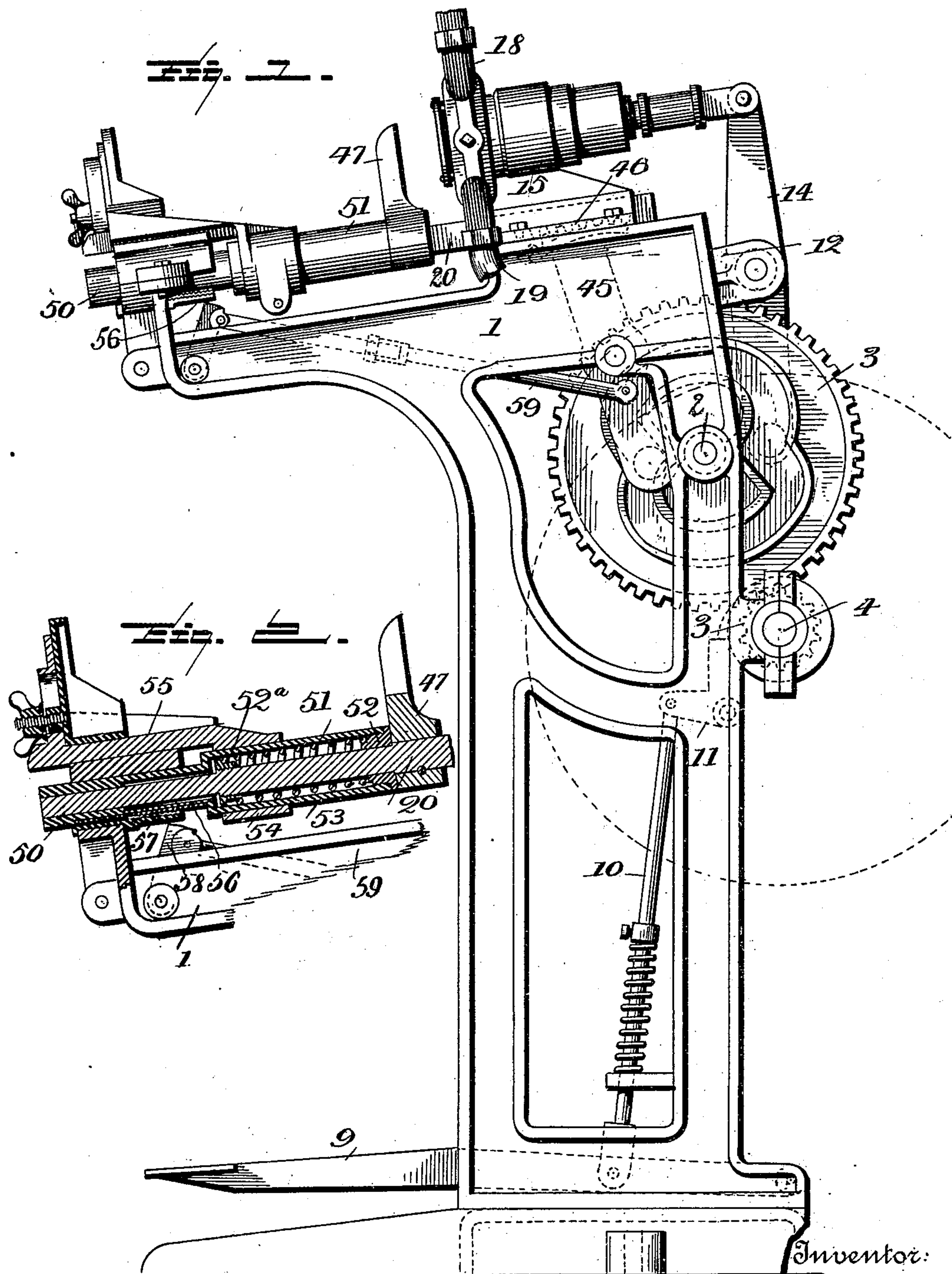
C. B. VAN HORN.

BOTTLE FILLING AND CORKING MACHINE.

(Application filed Aug. 18, 1899. Renewed Oct. 23, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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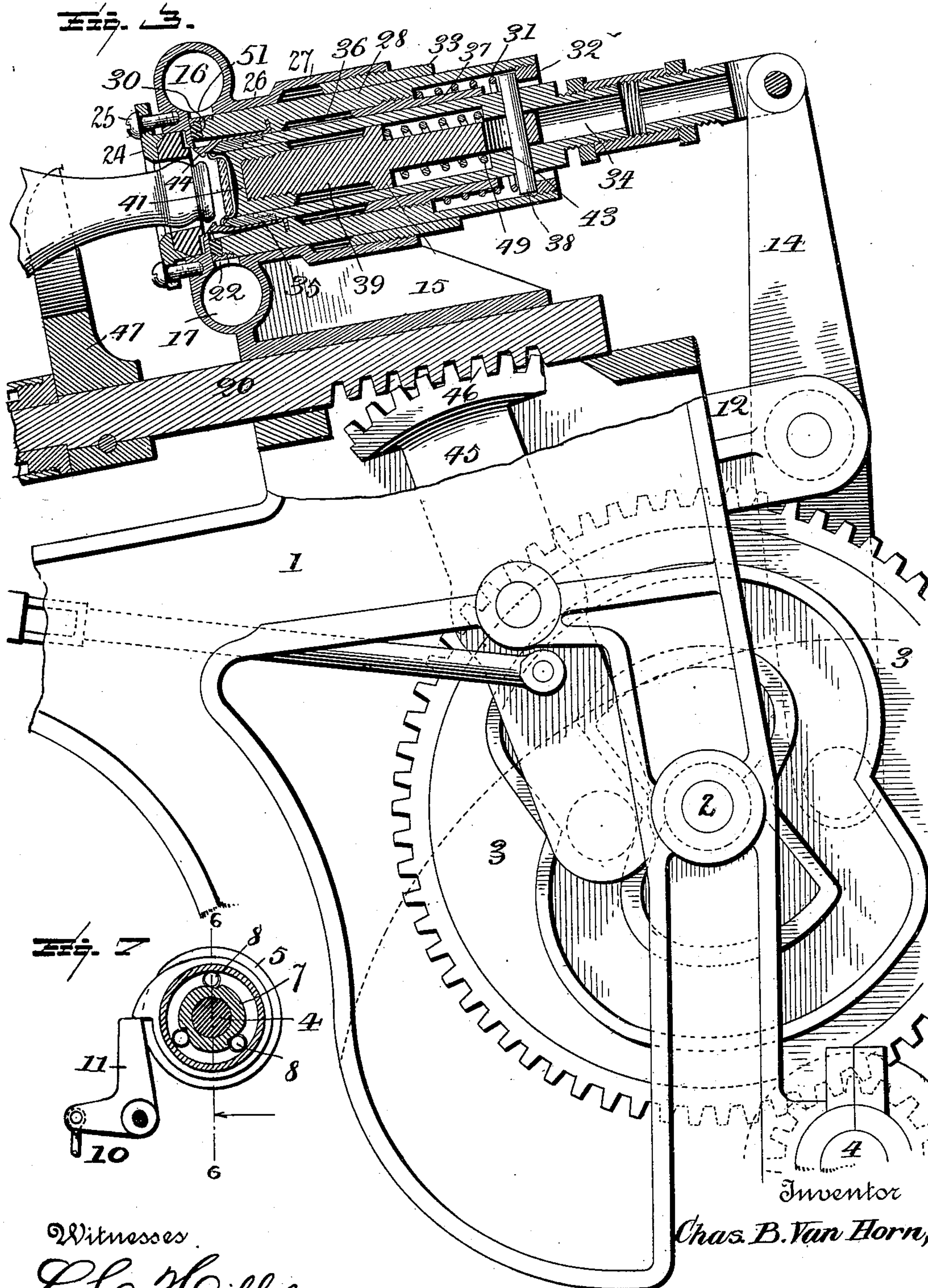
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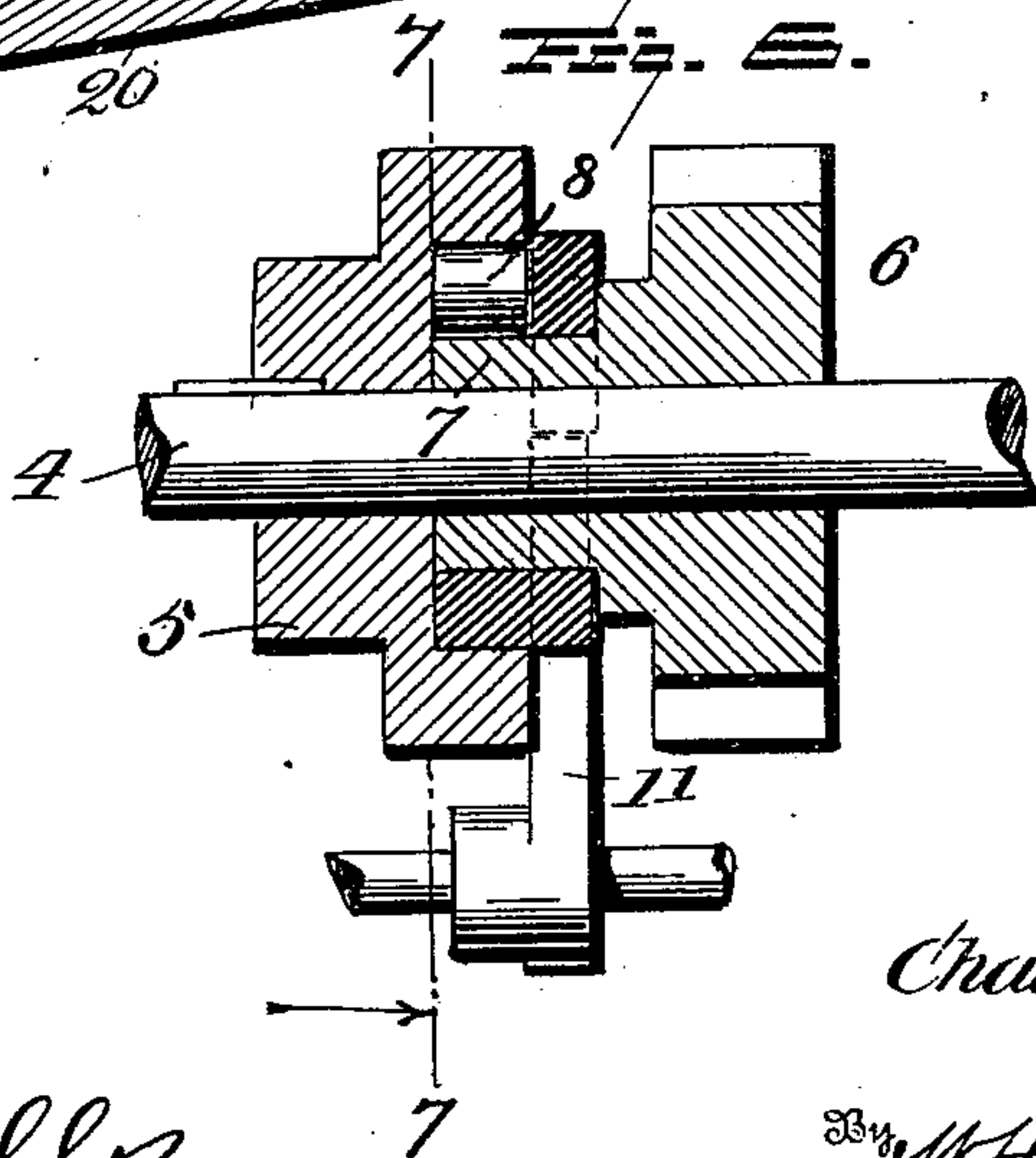
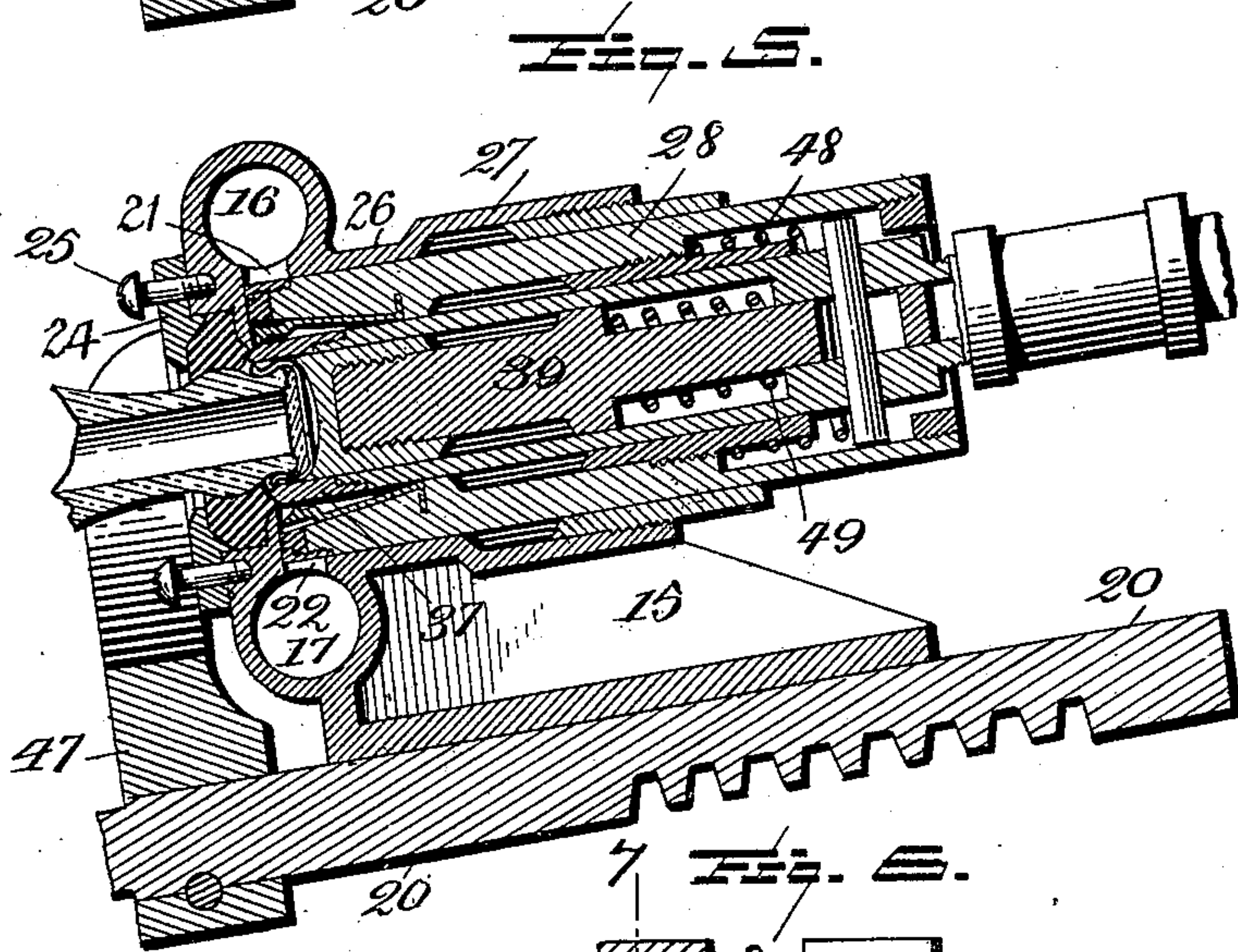
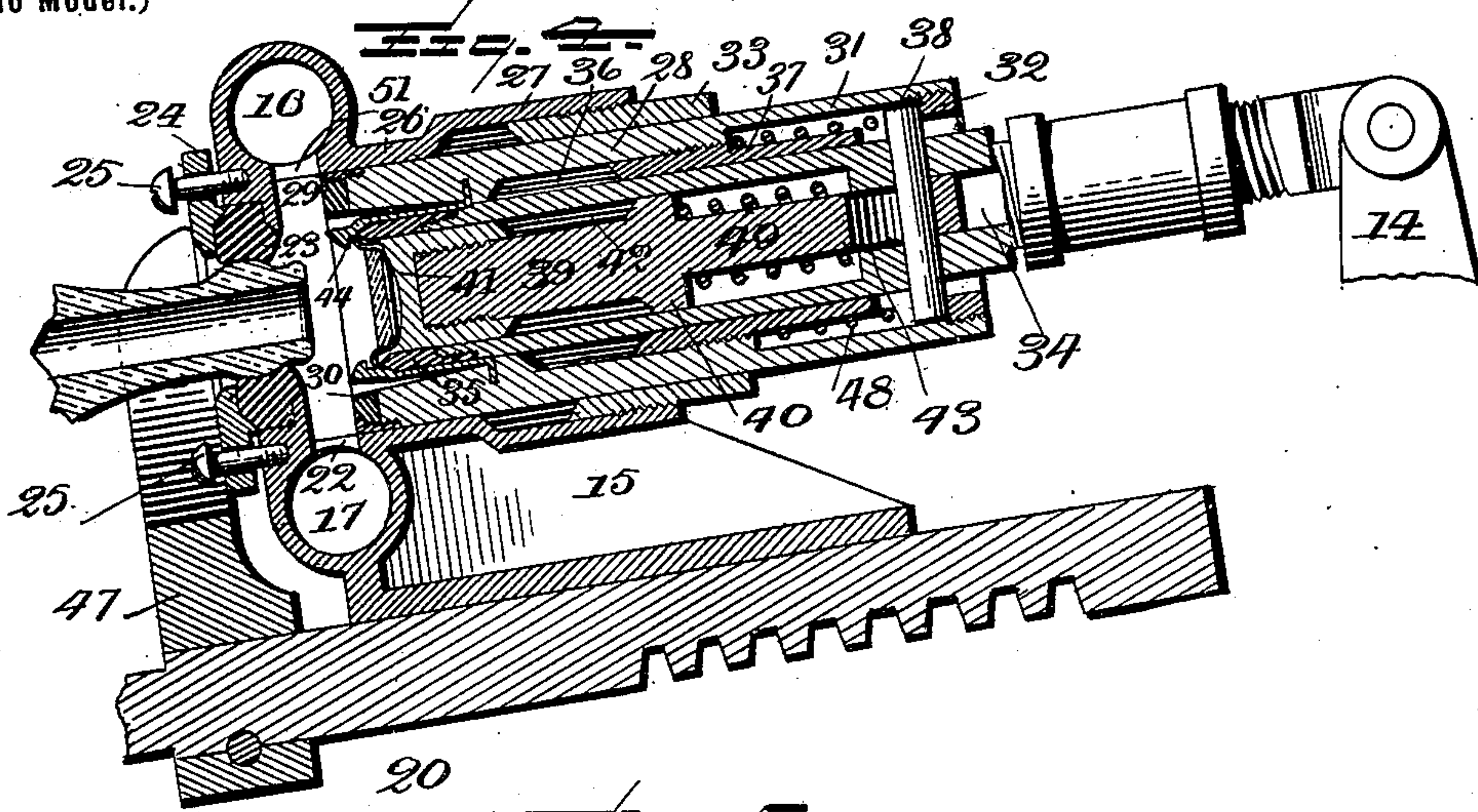
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3 Sheets—Sheet 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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BOTTLE FILLING AND CORKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 673,569, dated May 7, 1901.

Application filed August 18, 1899. Renewed October 23, 1900. Serial No. 34,063. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. VAN HORN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Bottle Filling and Corking Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is directed to improvements in machines for filling and corking bottles, and the following description, read in connection with the accompanying drawings, will enable any one skilled in the art to which my invention relates to comprehend its nature and to practice it in the form in which I prefer to employ it; but it will be understood that my invention is not limited to the precise embodiment herein described and illustrated, as many modifications and equivalent changes may be made by the skilled constructor to carry out the invention.

The cork which my invention is especially constructed to apply to the bottle is what is generally known as the "crown" cork, and the invention, so far as it relates to the filling operation, is designed for use in the machine organized and operated as set out in an application for patent filed by me on or about the 13th day of December, 1898, numbered serially 698,999, and to which, for the purpose of an understanding of such filling operation, reference may be had; but the improvements are not necessarily confined to such an organized apparatus.

The several mechanisms which perform the various steps of the operation are actuated through connections with a cam one-quarter turn of which imparts motion to all the mechanism necessary to perform the work of what I term the "first movement," which consists, first, in sealing the bottle; second, in sealing the cork-passage; third, in locking the bottle-support against the pressure required to apply the cork, and, fourth, in operating a valve forming a three-way opening to admit counter-pressure and liquid simultaneously to the bottle to be filled. These four operations are, as stated, all accomplished by the one-quarter

turn of the cam, and by this first movement the bottle is filled, and thereafter the second movement takes place and is caused by another one-fourth revolution of the cam. This second movement consists, first, in closing the three-way opening; second, in applying the cork to the neck of the bottle; third, in releasing the bottle-support, and, fourth, in carrying all the mechanisms to their original or normal positions. These four operations in the second movement are also accomplished by a one-fourth revolution of the cam. By these two movements of the cam, which turn it one-half revolution, a bottle is filled and corked. By rotating the cam one full revolution the mechanism is operated to fill and cork two bottles.

The main feature of the balanced-valve inlet, as shown in Figure 5 of the application filed December 12, 1898, Serial No. 698,999, is to retain the liquid-line at the flowing-point against the counter-pressure; furthermore, to allow the liquid to flow by gravity and to reduce the counter-pressure in the same cylinder. This balanced-valve inlet further serves to retain the liquid at the flowing-point when the bottle has been filled without changing any conditions whatsoever, and thereby making it impossible for the liquid to flow into the counter-pressure inlet.

A further object of the balanced-valve inlet is to increase or decrease the counter-pressure in proportion to the pressure on the liquid-inlet.

An object of my present invention is to construct a bottling-machine for filling bottles with carbonated liquid under a counter-pressure, in which the bottle is placed in substantially a horizontal position to be filled. The cork-applying mechanism, as well as the support for holding the bottle, operates approximately horizontally.

Various other objects are sought to be obtained by means of my invention, and they will be fully set forth in the following description and operation, forming a part of this specification, and the details of construction will be specifically described and then more particularly pointed out in the claims hereunto appended.

In describing my invention in detail refer-

ence is to be had to the accompanying drawings, forming a part of this specification, and wherein like figures of reference indicate similar parts throughout the several views.

5 Referring to the drawings, Fig. 1 is a side elevation of my improved bottling-machine. Fig. 2 is an enlarged detail sectional view of the bottle-support and bottle-locking means. Fig. 3 is an enlarged detail sectional view of
10 the filling-head and the corking means, showing the parts of said filling-head in the first position. Fig. 4 is an enlarged detail sectional view of the filling-head, showing the parts in the second position during the filling
15 operation. Fig. 5 is an enlarged detail sectional view of the same, showing the parts in the third position, after the cork has been applied to the bottle. Fig. 6 is an enlarged detail sectional view of the clutch, taken on the
20 line 6 6 of Fig. 7. Fig. 7 is an end view of the same, taken on line 7 7 of Fig. 6.

Referring to the drawings by reference-numerals, 1 designates the frame of a suitable construction to support the filling-head
25 and bottle-support, which will be hereinafter fully described. The frame is preferably provided with suitable apertures or the like to receive means whereby a series of similar frames may be secured together. In
30 the upper portion of the frame is a shaft 2, on which is rotatably mounted a cam 3, and in a series of machines said shaft 2 extends through the entire series and has a cam of the same construction rotatably mounted
35 thereon for each individual machine.

Journalled in a bearing of the frame 1 is the main shaft 4, said shaft extending through the series of machines and is adapted to receive power from any suitable source.
40 Keyed on the shaft 4 is a clutch-disk 5. (See Figs. 6 and 7.) Loosely mounted on the shaft 4 is a pinion 6, meshing with gear-teeth provided in the periphery of the cam 3. The pinion 6 has a cylindrical extension 7, which
45 projects into a recess in the clutch-disk 5 and is formed with depressions to receive clutch-rollers 8, the rollers being interposed between the extension and the wall of the recess.

Pivotally secured to the lower part of the
50 frame 1 is a foot-lever 9. Fulcrumed to said lever 9 is a rod 10, the upper end of which is pivoted to one arm of a bell-crank lever 11. The other arm of the lever 11 operates, in connection with a shoulder on the clutch-disk, to
55 bring the pinion into and out of engagement with the disk, as will be understood. One full revolution of the pinion operates to turn the cam preferably one-fourth revolution.

Pivotally secured to a lug 12, projecting
60 rearwardly from the frame 1 and near the top thereof, is a rock-lever 14, provided at its lower end with a roller, which is confined in a cam-groove formed in one face of the cam. Secured to the top of the frame 1 in any suitable
65 manner is a support 15, having formed preferably integral therewith a filling-head, which is provided with a back-pressure cham-

ber 16 and a liquid-chamber 17. (See Figs. 3, 4, and 5.) Leading to the back-pressure chamber is a pipe 18, which communicates
70 with an equalizing-chamber, such as is shown and described in the application filed December 12, 1898, hereinbefore referred to. Leading to the liquid-chamber is a pipe 19, which
75 also communicates with the equalizing-chamber. The filling-head is provided with a chamber which communicates with the back-pressure chamber 16 and the liquid-chamber 17 through openings 21 and 22.

Formed in the front face of the filling-head
80 and around the chamber is an annular recess receiving a rubber gasket 23, which is held in the recess by means of a ring 24, the latter being secured in position by means of ad-
85 justing-screws 25.

Formed integral with the filling-head and projecting rearwardly therefrom is a tubular extension 26, which is provided with an enlarged portion 27. Reciprocating in the
90 chamber in the filling-head and extension is a tube 28, and on the forward end of said tube is a screw-threaded flange 29, securing a rubber valve-ring 30 on the end of the tube 28. The internal chamber of the rear portion 31
95 of the tube 28 is of greater diameter than the forward end. Secured in said enlarged portion 31 is a screw-threaded flange 32. To form a tight joint between the enlarged tube portion 27 and the tube portion 31, packing is introduced and held in position by a packing-
100 gland 33.

Pivotally secured to the upper end of the lever 14 is a tube 34, on the forward end of which is a hardened-steel head 35. To form
105 a tight joint between the tube portion 31 and the tube 34, suitable packing is placed in the recess 36 and held in place by a packing-gland 37. Passing through the tube 34 and projecting beyond the outer face thereof is a stop-pin 38, said pin operating against the
110 flange 32.

Reciprocably confined in the tube 34 is a plug 39, which is provided with an annular
115 shoulder 40, fitting the inner face of the tube 34. Secured to the forward end of said movable plug 39 is a head 41, the inner end of which forms a gland to hold packing in recess 42. The rear end of the plug 39 is provided with a slot 43, through which the pin
120 38 passes. Secured to the inner face of the tube 28, near its forward end, are spring-fingers 44, which are adapted to engage and hold the crown cork against the hardened end of tube 34.

Fulcrumed to the frame 1 is a rock-lever
125 45, which is provided at its upper end with gear-teeth 46. The lower end of said lever 45 engages a cam-groove formed in the opposite face of the cam 3. The teeth 46 on the upper end of the lever 45 mesh with a rack-bar 20,
130 slidable in a groove in the lower portion of the support 15. Secured to the rack-bar 20, in any suitable manner at a predetermined distance from the filling-head is a fork 47,

which is moved by the rack-bar 20 against the ring 24 to compress the rubber gasket 23 to engage the neck of the bottle when introduced, thereby hermetically sealing said neck.

5 During the operation of filling and corking the bottle the rubber gasket engages the neck of the bottle just back of the groove formed therein to receive the fluted portion of the cap, the rubber gasket and bottle remaining
10 stationary throughout the entire operation of filling and corking the bottle regardless of the length of the bottle, the difference in the lengths of the bottles being provided for in the bottle-support.

15 48 denotes a spring coiled around the gland 37 and interposed between the pin 38 and a shoulder in the tube 28. This spring operates to force the valve-ring 30 against the forward wall of the filling-head chamber.

20 49 denotes a spring coiled around the plug 39, between the shoulder 40 thereon and a shoulder on the tube 34. This spring 49 operates to move the plug 39 to force the bottle out of the filling-head after the same has been
25 filled. During the operation of filling the bottles with carbonated liquid under a counter-pressure it is absolutely necessary to always maintain a perfect seal between the gasket 23 and the neck of the bottle as well
30 as at all the movable joints. Reciprocating in a suitable support at the forward end of the frame 1 is a tube 50, which is provided with an enlarged portion 51. Secured in the rearward end of the enlarged portion 51 is a

35 screw-threaded flange 52, serving as a bearing for the rack-bar 20. A spring 53 is coiled around the rack-bar between a shoulder 52^a thereon and the flange 52 and operates to retract the rack-bar. Secured to the enlarged
40 portion 51 in any suitable manner is a split collar 54, which has formed, preferably integral therewith, a bottle-support 55, the split collar allowing the bottle-support to be adjusted to accommodate bottles of different capacity.

45 Secured to the under side of the tube 50 is a toothed plate 56. In the opening in the frame through which the tube 50 reciprocates and held in place by means of lugs formed thereon is a toothed plate 57, which is adapted to
50 engage and mesh with the toothed plate 56 when a dog 58, operatively connected with the lever 45 by an adjustable rod 59, is brought into engagement therewith to lock the bottle-support against the force required
55 to apply the seal to the neck of the bottle. After the bottle-support has been locked in position by the dog 58 the pressure on the bottom of the bottle is removed, the bottle being held firmly in position by the compression of the rubber gasket 23 around the neck
60 of the bottle.

During the first one-fourth revolution of the cam the lower end of the lever 45 is moved forward and the upper end rearward, carrying
65 with it the bar 20 and tube 50 and also moving the bottle-support toward the filling-head until the mouth of the bottle comes

in contact with the inside of the cork, when movement of the tube 50 is checked. The bar 20, however, continues its traverse until
70 the lever 45 has completed its movement, the spring 53 compressing and thereby preventing injury to the bottle.

To fill and cork a bottle with the above-described mechanism, a crown-cork is placed
75 between and held by the spring-fingers 44, carried by the tube 28, the outer side of the cork-flange contacting with the hardened-steel head 35 of the tube 34. The bottle is then positioned in the bottle-support, and
80 through the bar 20 the bottle-support is moved to bring the mouth of the bottle into contact with the inside of the cork. The same movement of the bar 20 carries the fork 47 into engagement with the ring 24, which com-
85 presses the rubber gasket 23, hermetically sealing the neck of the bottle and holding the same in position. The tube 34 is moved rearwardly, carrying with it the tube 28, plug 39, and cork, and opening a passage-way for
90 the back pressure and liquid to the bottle. These steps in the operation are produced by the first one-fourth revolution of the cam. After the bottle is full the cam is moved another one-fourth revolution, which carries
95 the upper end of the lever 14 forward, compressing the spring 48, and said spring through its increased tension moves forwardly the tube 28, closing the filling-head chamber or what may be termed the "three-way opening."
100 The lever 14 continues its forward movement, carrying the tube 34 with it, until the cork comes in contact with the mouth of the bottle. The tube 34 continues to move forward, the steel head 35 engaging the outer edge of
105 the flange of the crown-cork, forcing said flange into engagement with the neck of the bottle. The head in the movement of the tube 34 forces the spring-fingers 44 outwardly, thereby releasing the cork. The same one-
110 fourth revolution of the cam unlocks the bottle-support and releases the bottle, and the tension of the spring 49 against the plug 39 forces the bottle out of the filling-head, and the parts are restored to their normal posi-
115 tions.

Particular attention is called to the construction of the cork-applying tube. Heretofore the cork-applying tube has been constructed with an internal taper to engage the
120 cork and force the flange into engagement with the neck of the bottle. With such construction should one bottle be longer than another the cork-applying tube moving the same distance each time would break the bot-
125 tle unless provision were made thereagainst in the bottle-support. Furthermore, the power required to hold the bottle against the pressure required to set the cork is sufficiently great to force the mouth of the bottle entirely
130 through the cork. In my construction the mouth of the bottle, regardless of its length, projects the same distance in the filling-head and is held in the one position during the en-

tire operation of filling and corking. Moreover, the cork-applying tube is of the same internal diameter throughout and engages the cork-flange only and does not come in contact with the crown of the cork, as is done in other machines used for the same purpose. The same pressure is put on each cork applied to the bottle, regardless of its length.

My improved machine is designed for continuous operation, and for this purpose, referring to Fig. 1, the main shaft 4 is power-driven, a belt-pulley thereon being shown by dotted lines, and this continuous operation renders the filling and cork-applying mechanism automatic under the control of an attendant by the clutch mechanism hereinbefore described.

I claim as my invention—

1. In a bottle filling and corking machine, a filling-head provided with a chamber having openings, a tube reciprocally confined in said chamber and having an annular valve at the forward end thereof adapted to control said openings, a cork-applying tube reciprocally confined in the tube, means on the first-named tube adapted to hold the cork against the forward end of the cork-applying tube, and a plug reciprocally confined in the cork-applying tube and adapted to force the bottle out of the filling-head when the same has been filled and corked.

2. In a bottle filling and corking machine, a filling-head provided with a chamber having openings, an annular valve reciprocating in the chamber to control said openings, a cork-applying tube reciprocating in the valve, a lever pivotally connected with the cork-applying tube to reciprocate the same, a plug reciprocating in the cork-applying tube to force the filled and corked bottle out of the filling-head, a cam to impart motion to the lever, a gasket around the bottle-opening of the chamber, and means operating against the gasket to compress the same and form a tight seal with the neck of the inserted bottle.

3. In a bottle filling and corking machine, a filling-head having a chamber, a pressure-chamber and a liquid-chamber in communication with the filling-head chamber, a tube terminating in an annular valve reciprocating in said filling-head chamber and controlling the passages between the chambers, a tube reciprocating within the valve-tube and having means for holding the cork, a plug reciprocating within the cork-holding tube, and means for imparting motion to the tubes.

4. In a bottle filling and corking machine, a filling-head having a chamber communicating with a liquid-supplier and a pressure-supplier, a tubular valve reciprocating within the chamber to control the communication between the chamber and suppliers, a compressible gasket around the bottle-opening of the chamber, means within the chamber for holding a cork, and means for driving the cork.

5. In a bottle filling and corking machine,

a filling-head having a chamber provided with a bottle-opening and passages leading to a liquid-supplier and a pressure-supplier, means in the chamber for controlling said passages, and separate means in the chamber for applying the cork.

6. In a bottle filling and corking machine, a filling-head having a chamber provided with a bottle-opening and passages leading to a liquid-supplier and a pressure-supplier, means in the chamber for controlling said passages, means in the chamber for applying the cork and for expelling the corked bottle, a compressible gasket around the bottle-opening, and means for compressing the gasket against the neck of an inserted bottle.

7. In a bottle filling and corking machine, a filling-head having a chamber provided with a bottle-opening and passages leading to a liquid-supplier and a pressure-supplier, means in the chamber for controlling said passages, means in the chamber for applying the cork, a compressible gasket around the bottle-opening, a ring at the gasket, and means operating against the ring to compress the gasket against the neck of an inserted bottle.

8. In a bottle filling and corking machine, a filling-head carrying bottle-filling means and cork-applying means, a compressible gasket around the bottle-opening of the filling-head, a reciprocable bar operatively connected with the driving mechanism, a bottle-support, and means on the bar for compressing the gasket against the neck of an inserted bottle.

9. In a bottle filling and corking machine, a filling-head having a bottle-opening, means on the head for forming a tight seal with the inserted bottle, a bottle-support, a spring-sustained bar for moving the support, and means for locking the support when the bottle is properly positioned.

10. In a bottle filling and corking machine, a filling-head having a bottle-opening a compressible gasket around said opening, a bar operatively connected with the driving mechanism, a tube slidable on said bar, a spring between shoulders on the bar and tube, a bottle-support on the tube and locking and releasing means for the tube.

11. In a bottle filling and corking machine, a filling-head having a bottle-opening surrounded by a gasket, a ring at said gasket, a rack-bar connected with the driving mechanism, a fork on the bar operating in the forward movement of the latter to press the ring against the gasket and form a tight seal with the inserted bottle-neck.

12. In a bottle filling and corking machine, a filling-head having a chamber provided with a central bottle-opening and lateral passages leading to a liquid-supplier and a pressure-supplier, a tube reciprocating in the chamber the forward end of the tube forming a valve to control the said passages, a tube within the valve-tube, means for reciprocating said second tube, a spring between shoulders on the

two tubes to impel the valve-tube forward, means on the valve-tube for holding a cork, and cork-driving means.

13. In a bottle filling and corking machine,
5 a filling-head having a chamber provided with a central bottle-opening and lateral passages leading to a liquid-supplier and a pressure-supplier, a spring-impelled tube reciprocating in the chamber the forward end of the tube
10 forming a valve to control the said passages, devices on the tube to hold a cork, a tube reciprocating in the valve-tube and having a

shoulder engaging a shoulder on the valve-tube, a plug reciprocating in the second tube and shouldered to engage the shoulder on the latter, and a spring between shoulders on the second tube and plug operating to propel the latter for the purpose specified. 15

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

CHARLES B. VAN HORN.

Witnesses:

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D. L. GITT.