No. 630,790. Patented Aug. 8, 1899.

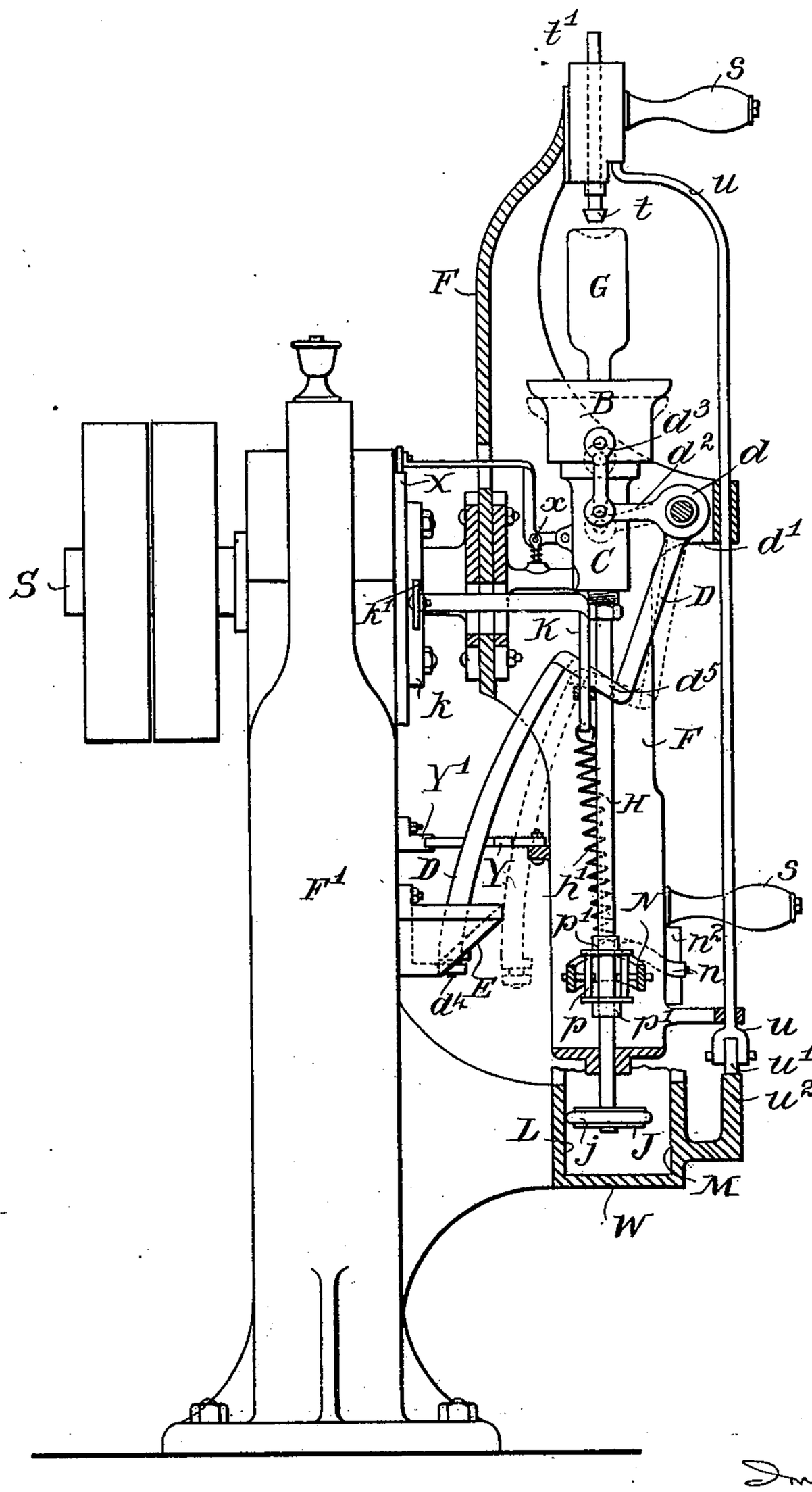
H. C. ADCOCK & S. F. LYLE.

MACHINE FOR FILLING SCREW STOPPERED BOTTLES.

(Application filed May 29, 1899.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1



Witnesses
J. B. Taylor
B. V. Tilden.

Inventors
Hazelwood C. Adcock
Samuel F. Lyle
by James L. Norris
Atty

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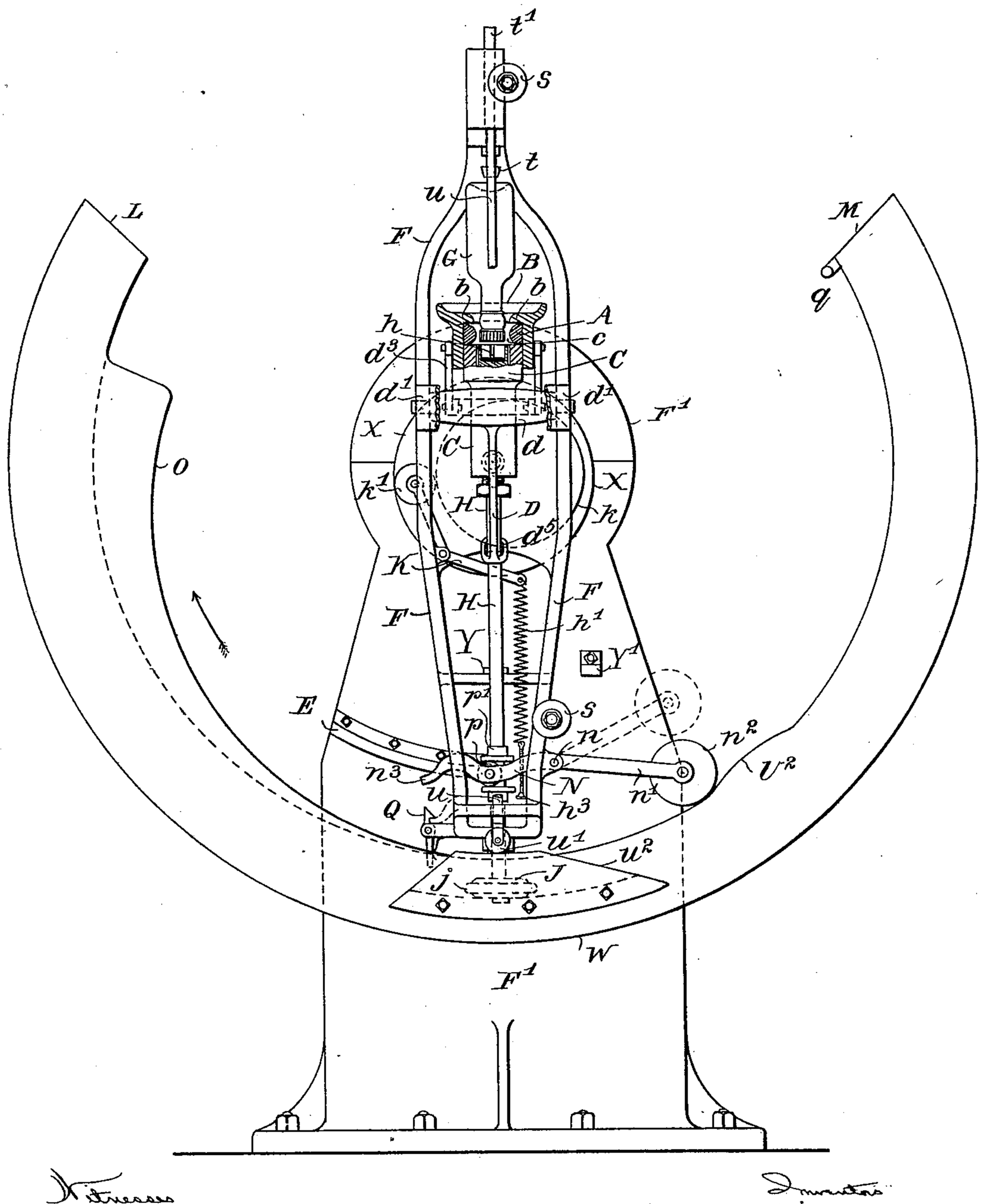
Fig. 2.



Witnesses
W. B. Keeler
W. V. Tilden

Inventors
Hazelwood C. Adcock
Samuel F. Lyle
By James L. Norris
Atty

No. 630,790. Patented Aug. 8, 1899.

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(No Model.) 4 Sheets—Sheet 3.

Fig. 3.

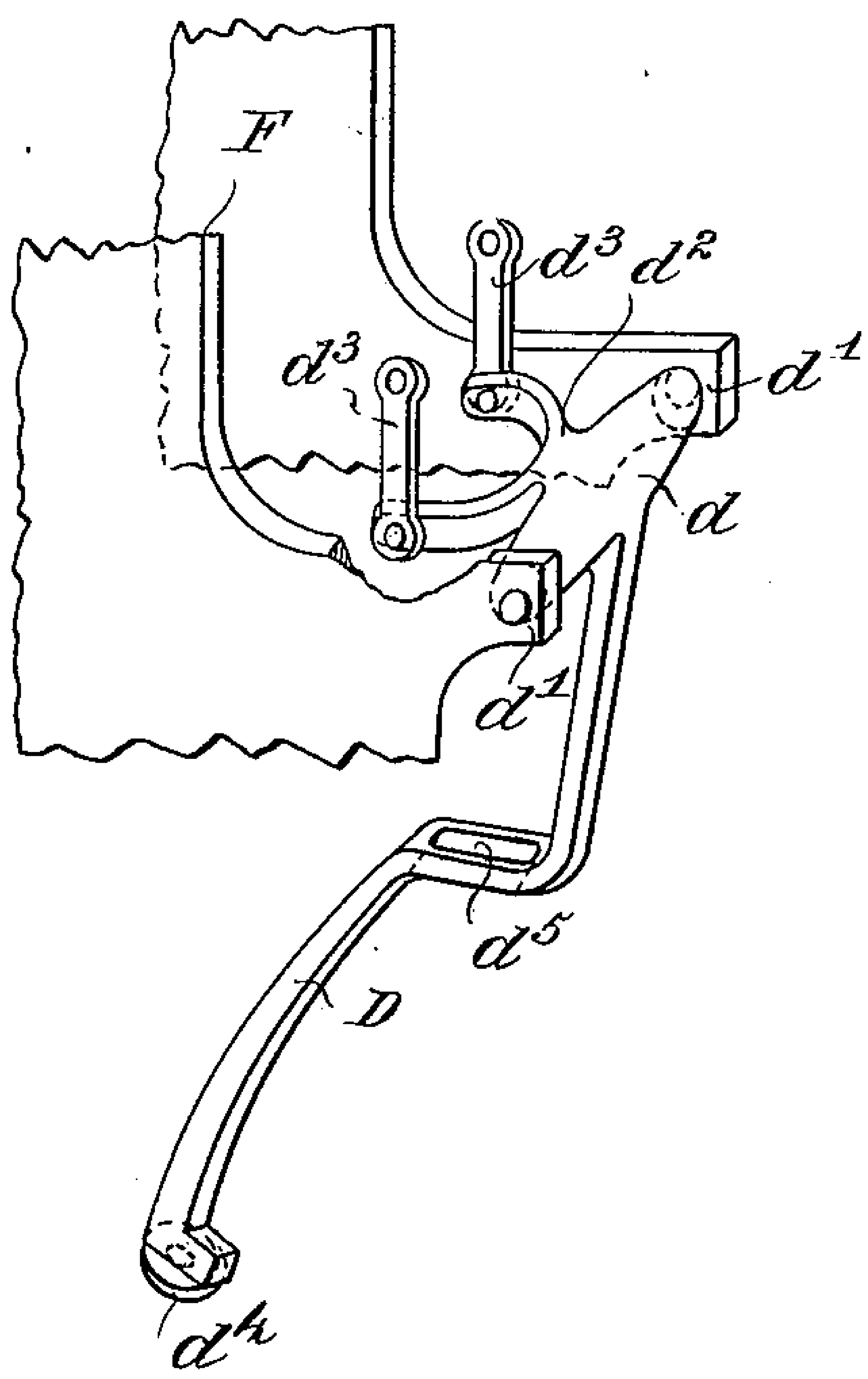


Fig. 4.

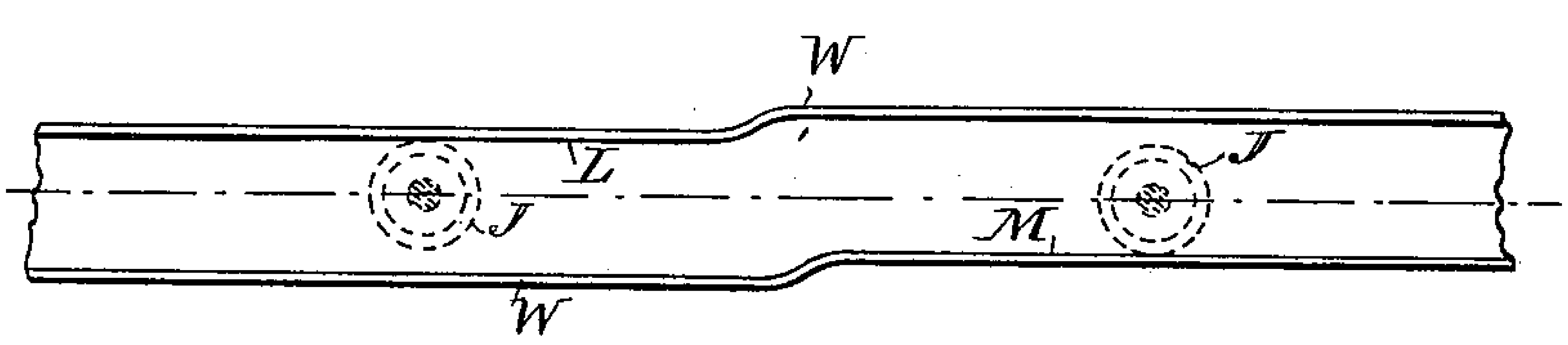
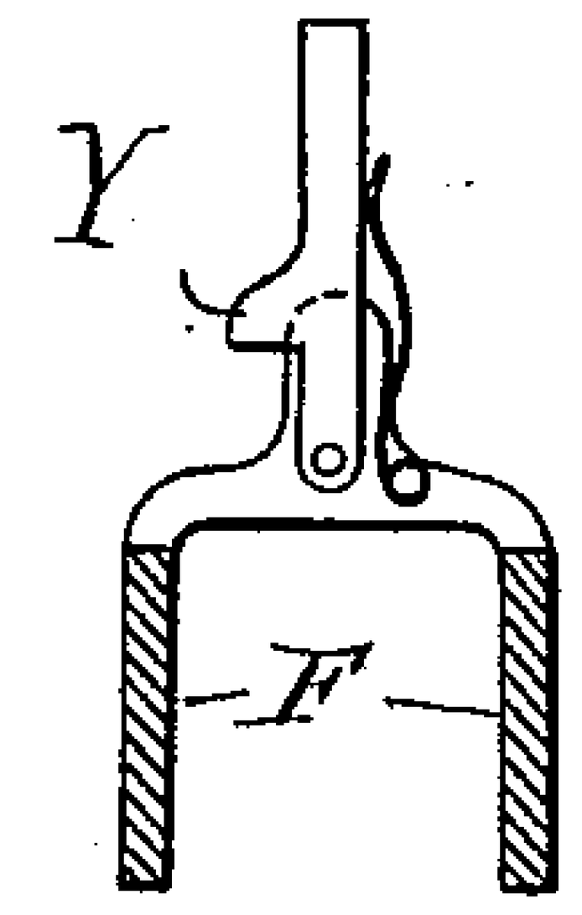


Fig. 5.



Witnesses
[signatures]

Inventors
Hazelwood C. Adcock
Samuel F. Lyle
by James L. Norris

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H. C. ADCOCK & S. F. LYLE.

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(No Model.) 4 Sheets—Sheet 4.

Fig. 6.

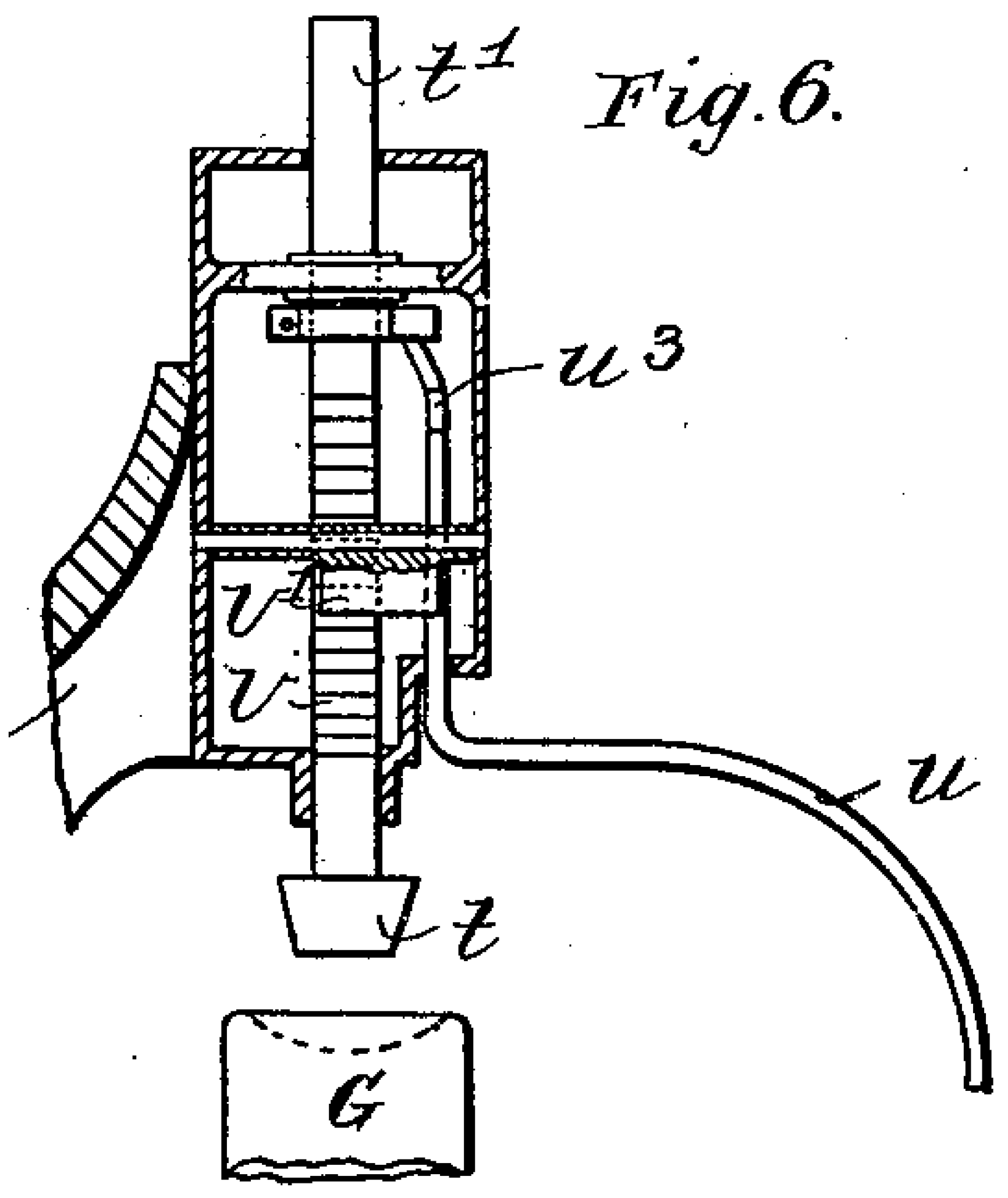


Fig. 8.

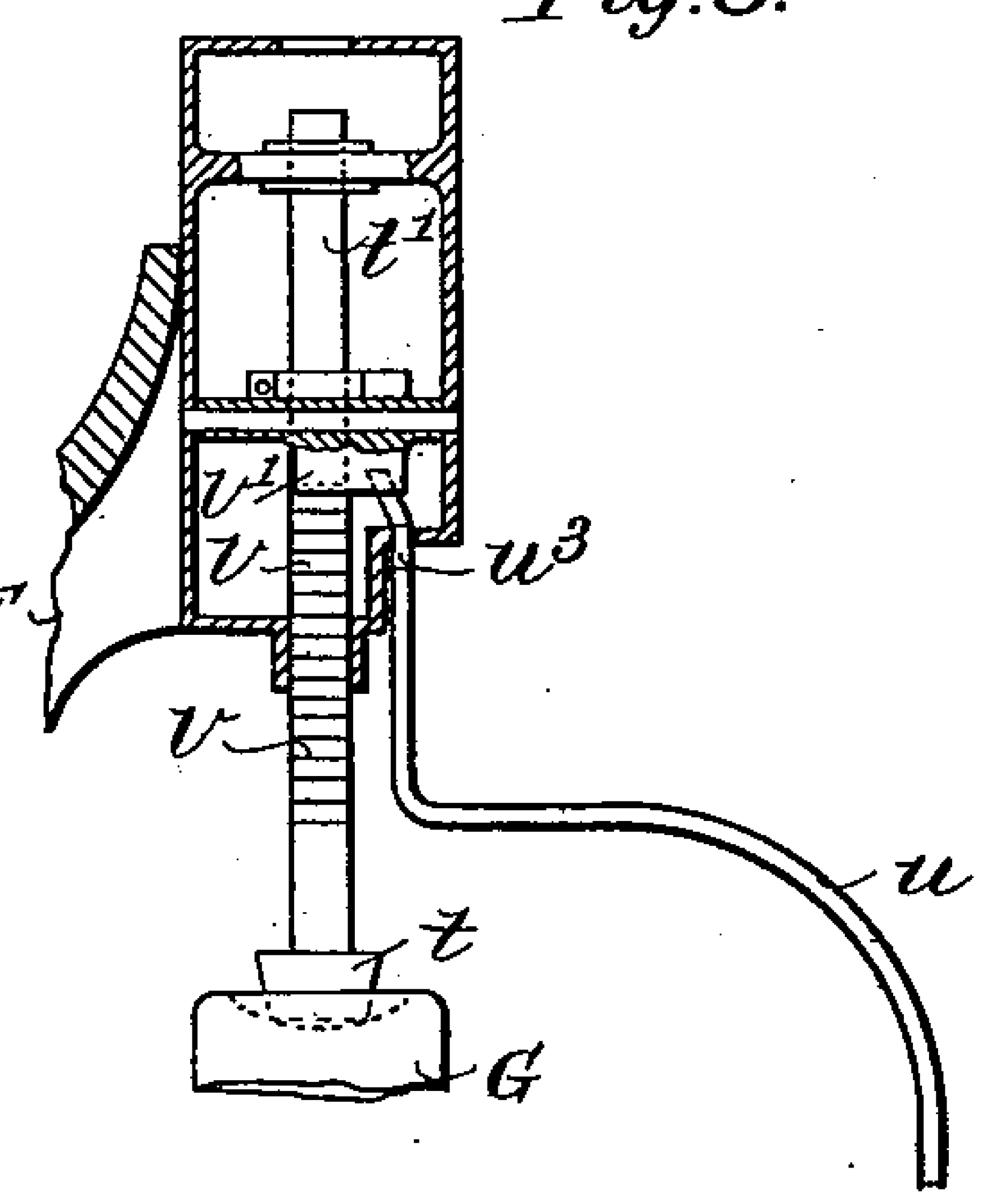


Fig. 7.

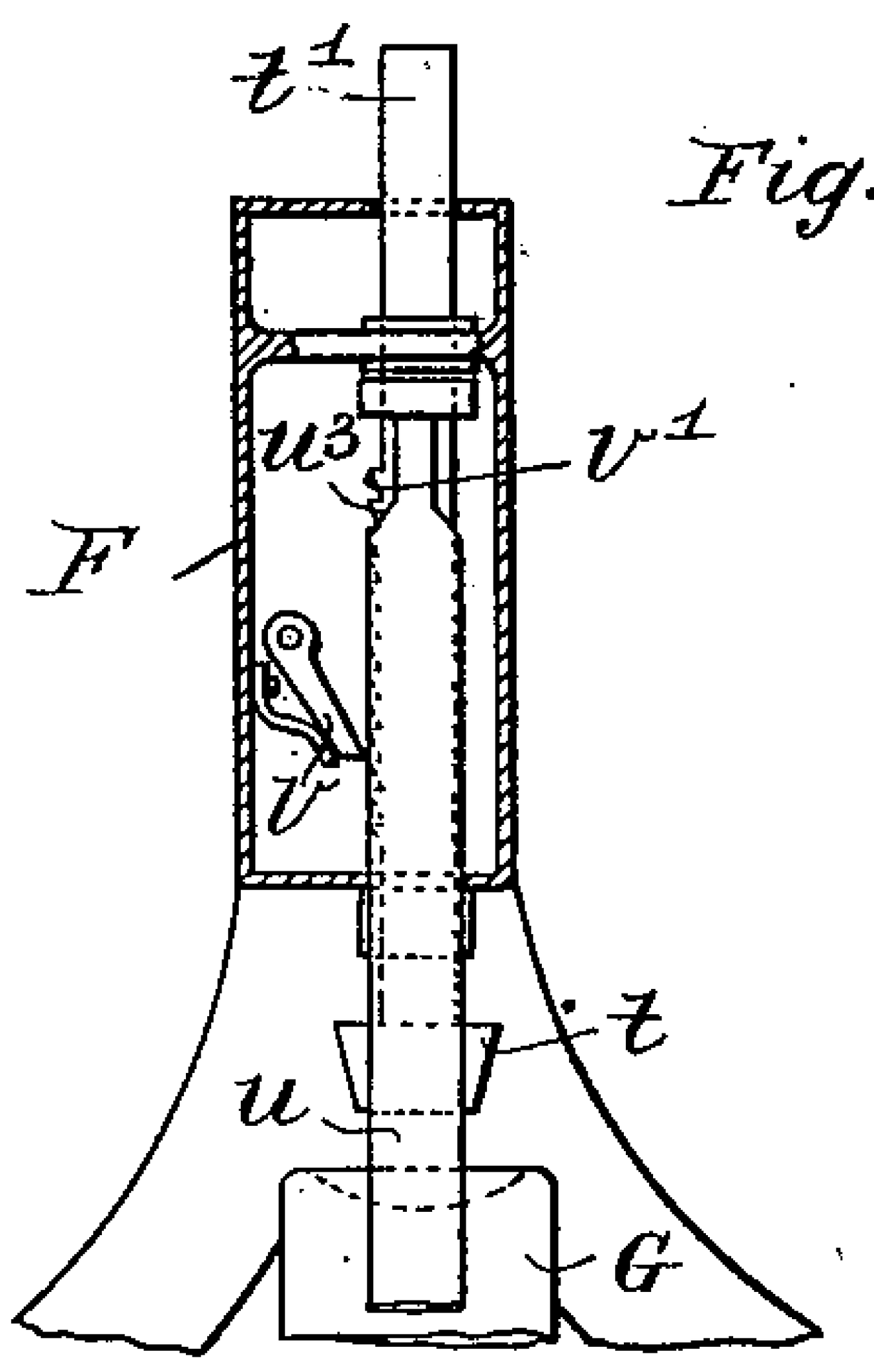


Fig. 9.

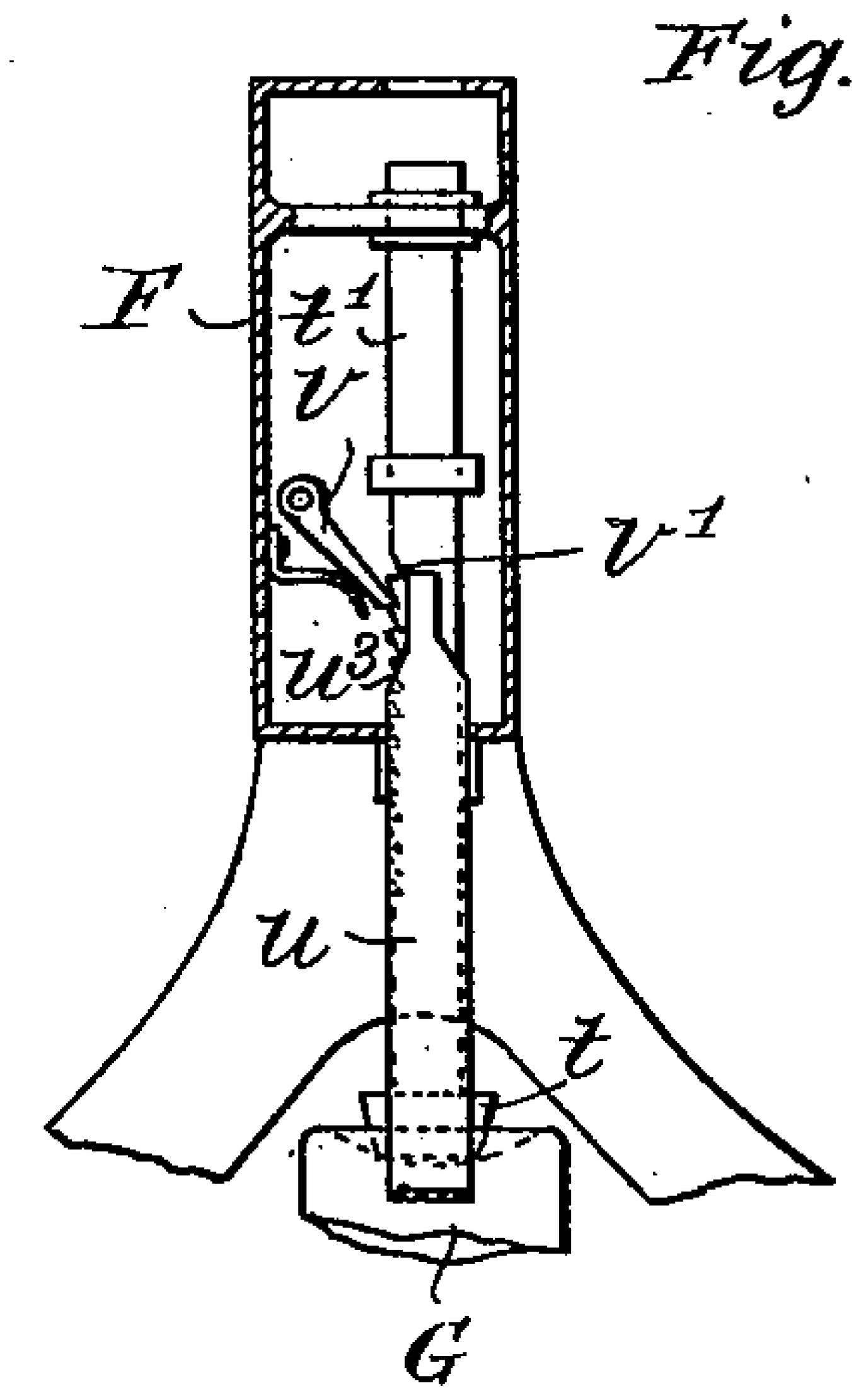


Fig. 10.

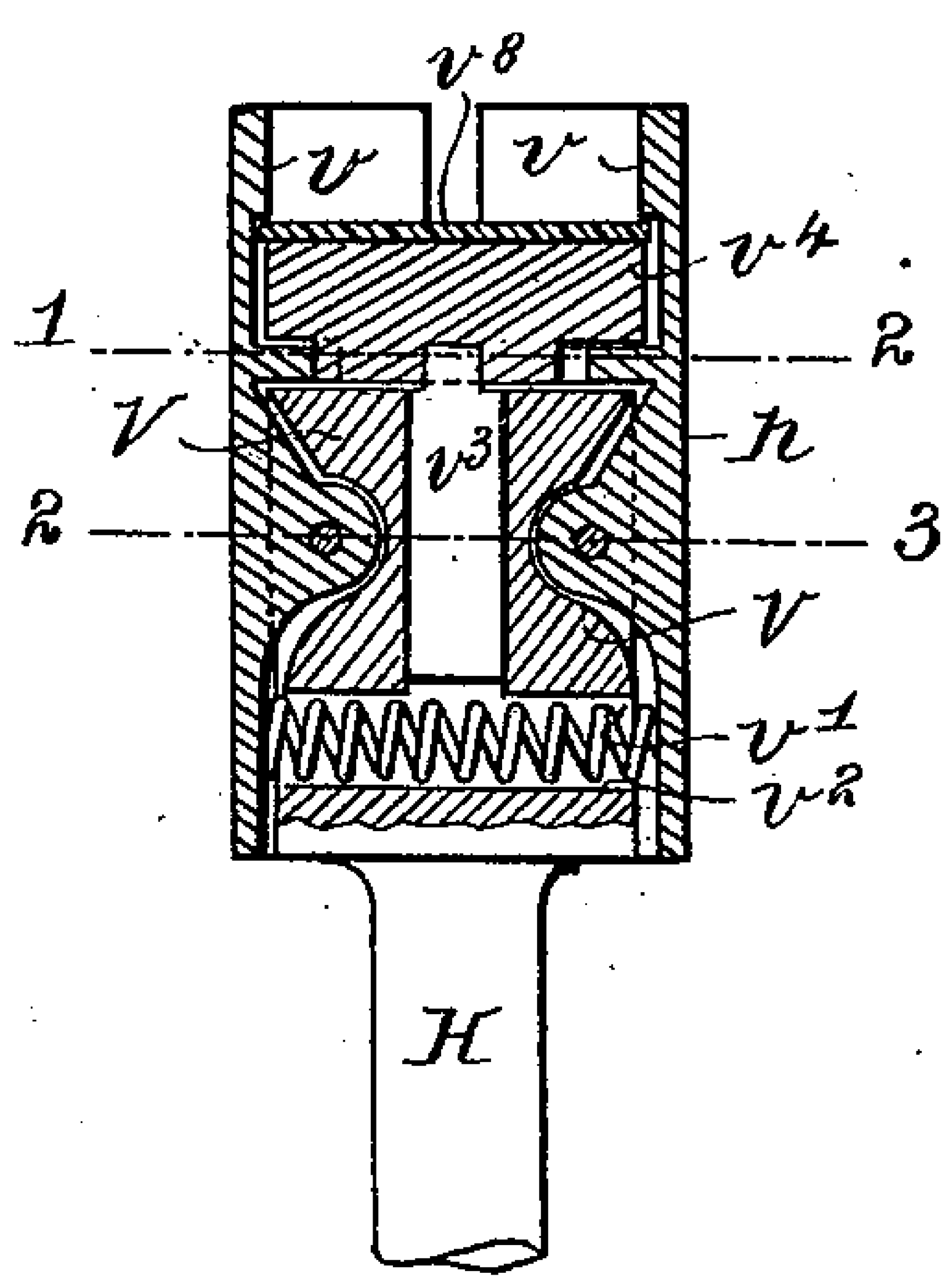


Fig. 11.

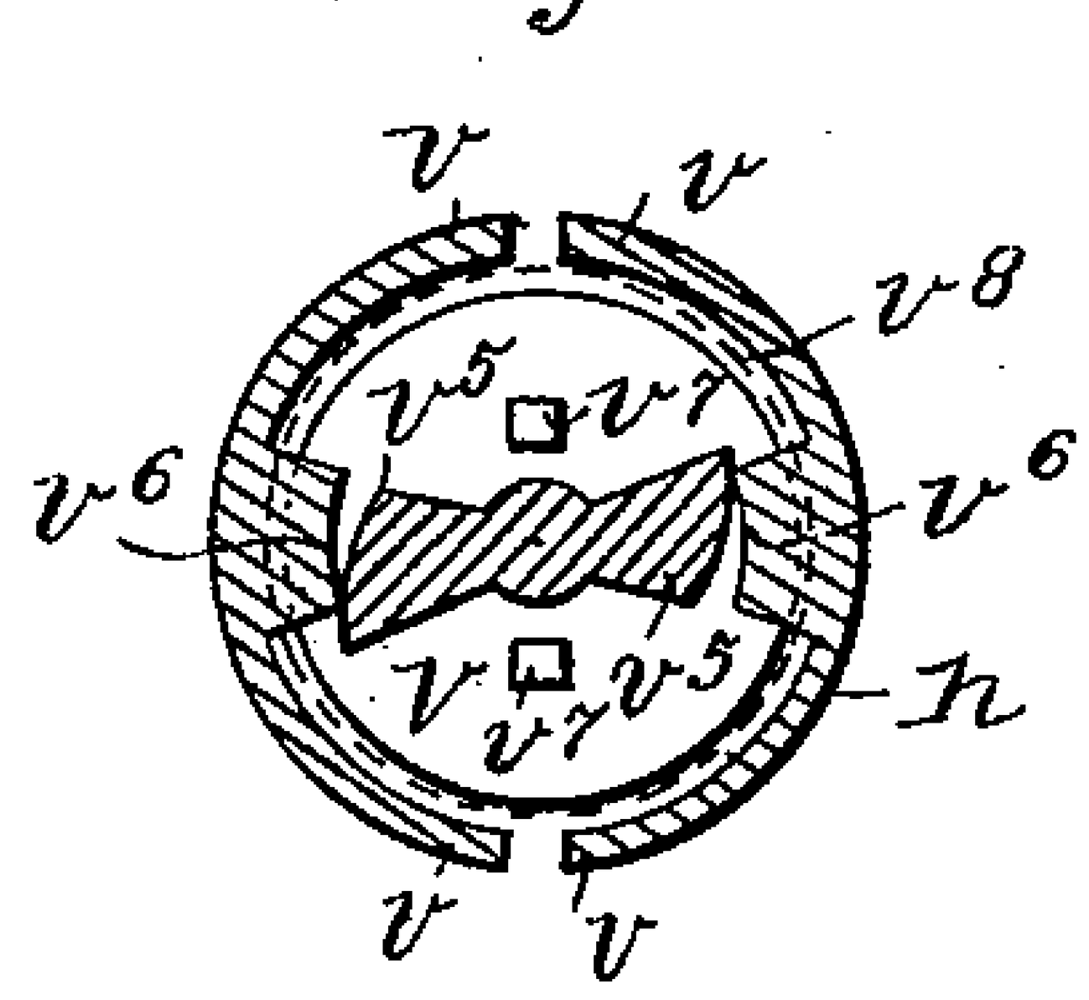
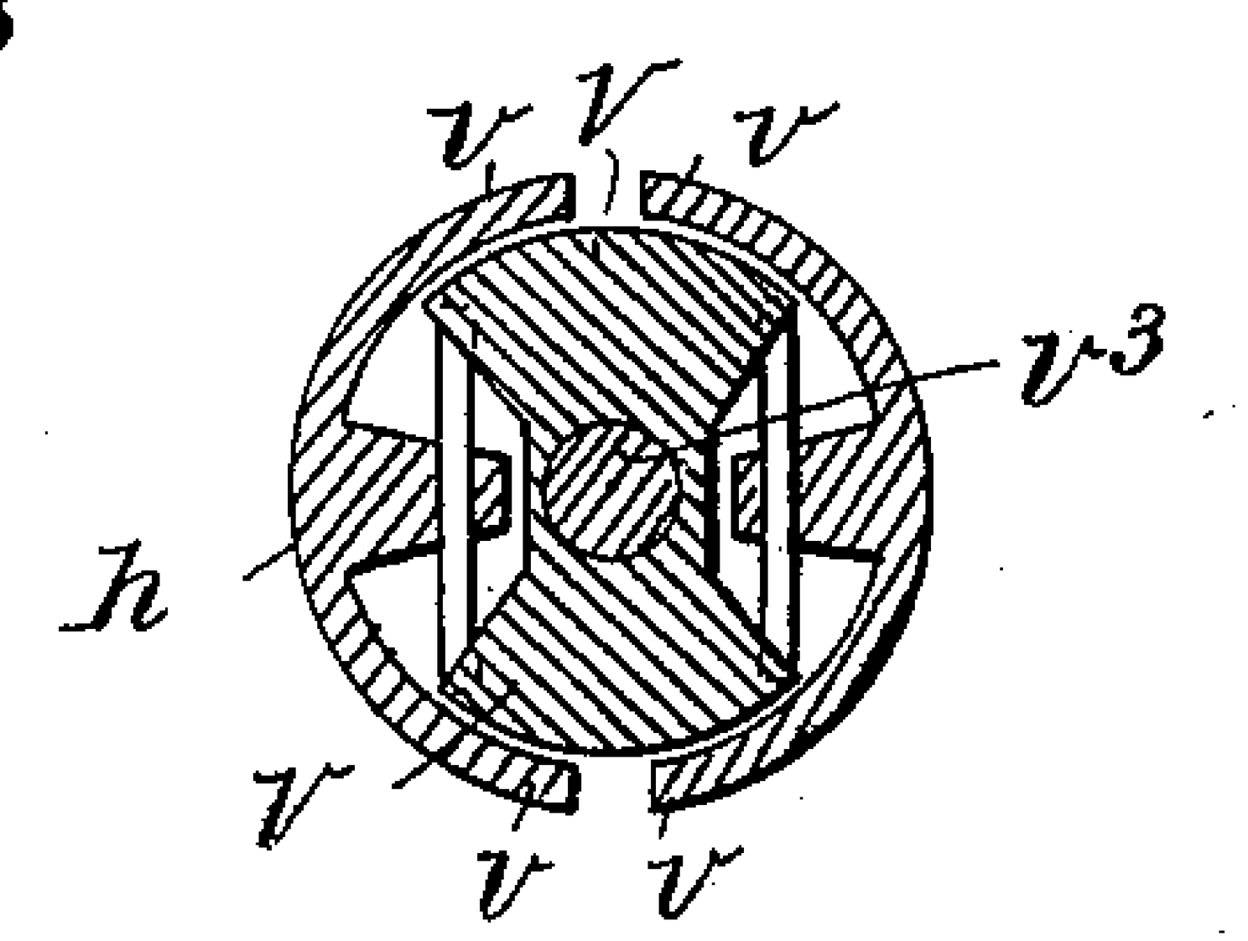


Fig. 12.



Witnesses
[illegible]
[illegible] Tilden

Inventors
Hazelwood C. Adcock
Samuel F. Lyle
by James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

HASELWOOD CLAUDE ADCOCK AND SAMUEL FRANCIS LYLE, OF WORTHING, ENGLAND.

MACHINE FOR FILLING SCREW-STOPPERED BOTTLES.

SPECIFICATION forming part of Letters Patent No. 630,790, dated August 8, 1899.

Application filed May 29, 1899. Serial No. 718,743. (No model.)

To all whom it may concern:

Be it known that we, HASELWOOD CLAUDE ADCOCK, residing at 62 Station road, and SAMUEL FRANCIS LYLE, residing at New street, Worthing, in the county of Sussex, England, subjects of the Queen of Great Britain, have invented a certain new and useful Machine for Filling Screw-Stoppered Bottles, (for which applications have been made in Great Britain under date of June 17, 1898, No. 13,483, and January 25, 1899, No. 1,783,) of which the following is a specification.

This invention relates to machines of the "turnover" type for removing the screw-stoppers from bottles and filling and restoppering same.

Our invention comprises improvements, first, in the mechanism for automatically holding the bottle and for removing the screw-stopper and replacing same after filling of the bottle; second, in the chuck used for receiving and grasping the bottle-stopper; third, in means for automatically varying the pressure of the chuck upon the stopper during the stoppering and unstoppering processes, and, fourth, in the mechanism for operating and controlling the chuck and the coned plug which enters the bottle-bottom and secures the bottle when placed with its stopper in the chuck.

For the purpose of our invention we use a machine similar to that known as the "turnover" in so far as regards the injection of syrup and the supply of aerated water, the whole being operated by one revolution of the machine by hand or power. The filling operation, however, forms no part of our present invention.

In the drawings, Figure 1 is a side elevation of a turnover-machine, shown partly in section and with our improvements applied thereto. Fig. 2 is a front elevation of same. Fig. 3 is a perspective view of the compression-lever and connections; Fig. 4, a small-scale plan of the runners, and Fig. 5 a plan of a catch hereinafter referred to. Fig. 6 is an enlarged sectional elevation of the head of the machine, showing the parts in raised positions. Fig. 7 is a similar view taken at right angles to Fig. 6. Fig. 8 is a section showing same parts in depressed positions, and Fig. 9 is a similar section taken at right angles to Fig. 8. Fig. 10 is a vertical section through the chuck; Fig. 11, a section on line 1 2 of Fig. 10, and Fig. 12 a section on line 2 3 of Fig. 10.

The machine is usually revolved by power applied to the main spindle S; but when operated by hand the pair of handles *s s*, diametrically disposed and equidistant from the turning-center, are used.

For automatically holding the neck of the bottle we provide an elastic annular collar A of D-shape section, with the curved part disposed inwardly and adapted when compressed to grip and hold the neck of the bottle. This elastic collar A is compressed between the flanges *b* of the cap B and the fixed head C of the machine by means of a compression-lever D, which is preferably of the form shown best in Fig. 3. It is cranked and slotted and extended downwardly and provided at its lower end with a friction-roller d^4, Figs. 1 and 3, adapted when the frame is rotated to strike upon an inclined plane E, fixed to the stationary frame F′ of the machine, and so to raise or lower, as required, the cap B above mentioned and as indicated by dotted lines in Fig. 1. The lever D is carried by its transverse head *d* in bearings *d′ d′* in the revolving frame F, and to its inwardly-projecting shorter arm d^2 is pivoted a pair of links d^3 d^3, connected to the compression-cap B, so that according as the lever is operated the cap B will be drawn down or forced up, the link connections causing the motions to take place in true rectilinear directions. When the cap B has been fully compressed, the lever D is caught and held in the position shown dotted in Fig. 1 by a spring-catch Y (shown separately in Fig. 5) and so remains until the completion of the revolution of frame F, when it is tripped by a block Y′. The compression of the collar A causes same to be bulged inwardly, so as to firmly grip the neck of the bottle G when placed therein, and thus a water-tight joint is insured during the operations of injecting the syrup and the aerated water.

The improved mechanism for removing and replacing the screw-stopper comprises a spindle H, which passes through a slot d^5 in the

cranked compression-lever D and through the lower part of the fixed head C of the machine. The spindle H carries at its inner end a chuck *h* for gripping the crown of the stopper, said chuck reciprocating within the chamber *c* of the head C, as hereinafter described. Upon its outer end the spindle H is provided with a foot-roller J, faced with india-rubber or suitable frictional material *j*. On revolution of the frame F the friction-roller J is caused to be revolved alternately in opposite directions by its frictional contact with one or other of the sides L and M, which are suitably joggled and disposed for this purpose, as shown in Fig. 4, of the channel-shaped bar W, which is fixed to or forms part of the stationary frame F′ of the machine. For this purpose when the friction-roller J comes into contact with the first side runner L, which is inwardly joggled for the purpose for a sufficient distance, the chuck *h* is revolved to the left and the stopper unscrewed from the bottle. On continued rotation of the machine the other side of the roller J comes into contact with the second side runner M, which is also joggled inwardly for a sufficient distance, and thereby the direction of rotation of the chuck *h* is reversed and the stopper again screwed into the bottle. The great advantage of this frictional contact is that as soon as the screw-stopper has been sufficiently screwed home in the bottle the roller slips upon the side runner M and so prevents damage to the stopper by overdriving. In addition to the rotary movements above described the spindle H is also arranged to have a lengthwise or longitudinal movement for the important purpose of withdrawing the stopper when unscrewed, as described, for a convenient distance from the bottle-mouth to enable the filling operations to be performed, and means are also provided for automatically varying the pressure applied by said chuck to the stopper during the processes of screwing same in and out. For these purposes the spindle H is normally forced inward or toward the center by an adjustable spring *h′*, attached at its upper end to a lever K and at its lower end by an adjusting device h^3 to the lever N hereinafter described, and it is forced outward or away from the working center of the machine at the proper time by a friction-roller n^2, mounted at one extremity *n′* of a lever N, pivoted at *n* upon the revolving frame F. This roller n^2 (the normal position of which is shown in hard lines) engages with and is raised by a cam O, formed on the stationary frame F′ and disposed in the required position in the path of revolution of the frame F, so depressing the extremity n^3 of the lever N, which by means of an antifriction-roller-bearing surface *p* acting between collars *p′ p′*, fixed upon the spindle H, forces the spindle outward (against the tension of spring *h′*) until the extremity n^3 of the lever N is caught and retained by a spring-catch Q. At the proper moment during this revolution the said spring-catch Q is released by engaging a stop *q*, fixed on the stationary frame W.

The means for automatically varying the pressure applied by the chuck to the stopper during the processes of screwing same in or out are shown in Figs. 1 and 2, and consist of a disk *k*, adjustably secured by bolts to the fixed bed-plate F′ of the machine and preferably eccentrically arranged in regard to the turning-center of the revolving frame F. On revolution of the latter the said disk *k* operates through a friction-roller *k′*, carried on the end of the cranked lever K, which is connected by the mainspring *h′* of the machine to the chuck-operating lever N, as described. Thus by the eccentric mounting of the disk *k* referred to the tension on the spring *h′* is automatically varied, and thereby the pressure imparted to the chuck-lever and transmitted by the chuck *h* to the stopper during screwing same in and out of the bottle is correspondingly varied.

The stopper-holding chuck according to our present improvements is shown in Figs. 10, 11, and 12. It consists of a body part V of appropriate shape and made in one with or fixed to its operating-spindle H. To the body V, at opposite points, is pivoted a pairs of jaws *v v* for receiving and gripping the screw-stoppers. These are normally pressed together at the operating end by a spring *v′*, which may conveniently be arranged to pass through a hole v^2 in the said body V. The body is vertically bored out to receive the guide-stem v^3 of a rotary circular cam-headed pad-piece v^4. This is furnished at opposite sides with a pair of corresponding cams v^5 v^5, the outer configuration or working surfaces of each of which presents a curvilinear incline terminating in a flat part. These cams v^5 engage at certain times with internal projections v^6, formed on the above-mentioned pivoted jaws *v v*, and on the body part V are provided stops v^7 for limiting the rotation of the cams and pad-piece v^4. The working face of the pad-piece is provided with a rubber cushion v^8 to receive the head of the stopper and act on same when required. By the above-described improved construction the jaws *v v* when out of use are always locked open by the interaction of the cams v^5 on the rotary pad v^4 and the coacting jaw projections v^6. When, however, the parts are put into operation, the cams are withdrawn, and the jaws are then instantly closed and grip the sides of the stopper; but directly any resistance is offered by the stopper when sufficiently screwed in the jaws are automatically freed and opened and the stopper released, thereby preventing injury thereto.

For securing the bottom of the bottles we use a pad made, as shown at *t*, of conical shape, in order that when pressed down by a spring or otherwise in any convenient way the smaller end will come into contact with the bottom of the bottle G, the sloping sides as-

sisting the entering and removal of same from the chamber C. The face of the pad is considerably smaller than the bottom of the bottle, so as to pass freely within the usual recess provided. This arrangement and construction centralizes the bottom of the bottle from any position, aided by the pressure of the gas, and effectually prevents it from getting out of line with the chuck. Our invention also comprises means for so operating this holding-plug *t* for the bottle-bottom as to provide for securing bottles of various lengths and efficiently stoppering same. Our improved mechanism for operating and controlling the actions of such plug consists in an arrangement of ratchet-rack U and spring-pressed pawl U′, the former being upon the spindle *t′* of the plug *t* and the latter pivoted to the frame F. The plug-spindle *t′* is raised at the proper times by a rod *u*, automatically actuated at the proper times by a foot-roller *u′* engaging a fixed cam u^2 upon the frame, and upon such rod is formed an inclined plane u^3 for operating the pawl as required. The plug-spindle *t′* falls by gravity, aided, if necessary, by spring action. When the plug-spindle has been allowed to fall and the plug to engage the cavity in the bottle-bottom, the pawl U′ is freed from the incline and engages the spindle-rack U, preventing its rising and releasing the bottle; but at the proper time on the rising of the said rod *u* the said inclined plane u^3 thereupon passes under the pawl or a projection therefrom and serves to disengage same from the rack U, and then after a suitable interval the spindle and plug are free to be raised by the lifting-rod *u* referred to. In connection with this arrangement and for the purpose of enabling the chuck to rescrew the stopper tightly in the bottle the chuck is caused to be lowered for a short distance inside the compression-chamber B, so as to admit of the bottle being placed deeper in same. To effect this, we arrange a cam U^2 on the stationary frame F′, by which the chuck-lever N is operated and depressed sufficiently and at the required time.

The operations of all the levers are effected by friction-rollers at the outer ends, under which pass cams formed upon the frame and timed to operate same during the turning over of the machine at the proper times.

The cycle of operations is as follows: The machine being in the position shown, the pad *t* is lifted by the means described—namely, by the cam u^2 and rod *u*—and the neck of the bottle G, with a screw-stopper inserted, is then placed in the head of the machine and the pad *t* released. The stopper is thus forced into the spring-jaws of the chuck *h* and the whole bottle is securely held in an upright position. The revolution of the frame F upon the spindle S in the direction of the arrow, either by power or the handles *s s*, causes the roller d^4 to travel up the inclined plane E, which motion causes the lever D to evenly pull down the cap B and compress the collar A firmly around the neck of the bottle, and then the lever D is held by the catch Y. At this time the foot-roller J of spindle H is timed to come into gear with the first side runner L, whereby the chuck *h* is revolved to the left and the screw-stopper partially unscrewed from the neck of the bottle. The spindle N is then forced outward against the force of its spring *h′* by the friction-roller n^2 passing over the fixed cam O, withdrawing with it the screw-stopper clear of the inflowing fluid, and it is retained in that position by the spring-catch Q. At this point the syrup is caused to enter and is followed by the aerated water, both being supplied by the usual leather "cut-off" or otherwise. Continuing the revolution of the frame F, the catch Q is tripped by the fixed stop *q*, allowing the spindle H to be returned to the center by the action of the extended spring *h′*, while the roller J, passing on to the second runner M, is revolved in the opposite direction and so screws the stopper tightly into the neck of the bottle, cams *k* and U^2 performing their above-stated functions at their appointed times during the cycle of revolution. The operation is then complete, and the lever D is released from this holding-catch Y by the action of block Y′. Then the pad *t* is released by the cam u^2 acting on the arm *u*, so as to allow removal of the bottle. During the time that the bottle is filling an automatic snift-valve *x*, actuated at the proper time by a cam X on the bed of the machine, allows the air in the bottle to escape; but the filling processes and their means form no part of our present improvements. For filling bottles in a stationary position the above-described motion may be equivalently attained and the wheel J may be operated by said runners L and M being caused to revolve instead of the bottle-frame F, as above described, or the said side runners may be reduced in diameter and geared up to a necessary speed. In this case the bottle-frame or the revolving side runners are provided with an endwise or transverse motion to bring the roller and side runners into alternate contact; but we prefer the arrangement above set forth. In the turnover-machine hereinbefore described it is obvious that two or more bottles may be filled by duplicating or multiplicating the mechanism.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In machines of the "turnover" type for unstoppering, filling and stoppering screw-stoppered bottles, the combination with a stationary frame, a revolving frame, a stationary head carried by the revolving frame, a reciprocating compression-cap, and a collar of D-shape cross-section contained in said cap, of a forked and cranked compression-lever mounted in said revolving frame, links connecting said lever with the compression-cap, a foot-roller mounted in one end of said lever, an inclined plane fixed on the station-

ary frame of the machine in position to afford a bearing for the foot-roller of said lever, whereby on rotation of the revolving frame a water-tight joint will be formed during the operation of syruping and supplying aerated water, and catch mechanism for controlling the position of said compression-lever, substantially as described.

2. In machines of the "turnover" type for unstoppering, filling and stoppering screw-stoppered bottles the combination with a spindle carrying a spring-chuck at its inner end and a foot-roller at its outer end, of alternately-disposed side runners joggled as specified and an adjustable spring-acting lever and roller, an operating-cam for the latter and a spring-catch and a fixed stop, whereby the said spring-chuck and spindle receive alternating rotary motions in reverse directions and endwise motions at the required times, substantially as and for the purpose described.

3. In "turnover-machines" the combination with the spindle and means for operating same as described, of a stopper-holding chuck comprising a body part, a pair of oppositely-pivoted spring-pressed jaws, a rotary circular cam-headed pad-piece, operating-cams for same, internal projections upon said jaws and limiting-stops for said cams, and a rubber cushion for receiving the head of the stopper, whereby when the cams are withdrawn the jaws instantly grip the stopper but release same when sufficient resistance is offered, substantially as set forth.

4. In a "turnover-machine," the combination with the rotary frame of the machine, the chuck-spindle and spring and means for operating same, of an adjustable disk fixed to the stationary frame arranged eccentrically to the turning-center of the revolving frame, a cranked lever pivoted to the rotary frame and carrying a foot-roller at one end engaging said disk and connected at its other end to the said spring, whereby the tension on the said spring is automatically varied and the pressure imparted to the chuck-lever and transmitted by the chuck to the stopper during screwing same in and out of the bottle is correspondingly varied.

5. In a "turnover-machine," the combination with the stationary frame of the machine, and a rotary frame, of a rotary and longitudinally-movable chuck-spindle, a cam fixed to the stationary frame of the machine, a lever N engaged with the chuck-spindle and provided at one end with a roller n^2, a catch for the other end of said lever, and a stationary stop to release said catch, substantially as described.

6. In a "turnover-machine" the combination with the fixed head of the machine and the compression-cap, of the compression-lever and connecting-links and means for operating same on revolution of the rotary frame, and the spring-catch and block for controlling the position of same, substantially as herein set forth.

7. In a "turnover-machine" a coned plug adapted to fit into the recess at the base of the bottle, a spindle carrying said plug and a rack on said spindle, in combination with a slide-rod operated by a foot-roller engaging a cam upon the fixed frame of the machine and having an inclined plane in proximity to a spring-pressed pawl engaging said rack whereby when the slide-rod is raised the incline disengages the pawl from the rack and releases the plug, but when said slide-rod is allowed to fall the pawl is freed and engages the rack to prevent the plug from rising.

8. In combination, the stationary head C of the machine, the reciprocating compression-cap B and collar A of D-shaped section for grasping the bottle-neck, the cranked and slotted lever and links d^3 for operating said compression-cap, the chuck h with spring-pressed jaws $v\ v$ for gripping the stopper and cam-headed pad-piece v^4 operating the jaws, the chuck-spindle H with foot-roller J, the joggled runners L and M the spring-acting lever N and cam o for imparting alternating rotary or endwise motions to said spindle, the cranked lever K and adjustable disk k for automatically varying the pressure upon the chuck-spindle, the cam U^2 on the stationary frame operating the spring-acting lever N for lowering the bottle into the compression-chamber, the coned plug t the rack U on the plug-spindle t' and pawl V' engaging same, the slide-rod u with inclined plane u^3 acting with said pawl to release the plug, all substantially as set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

HASELWOOD CLAUDE ADCOCK.
SAMUEL FRANCIS LYLE.

Witnesses:
PETER MCWILLIAM,
WILLIAM THEODORE DITCHAM.