

No. 751,555.

PATENTED FEB. 9, 1904.

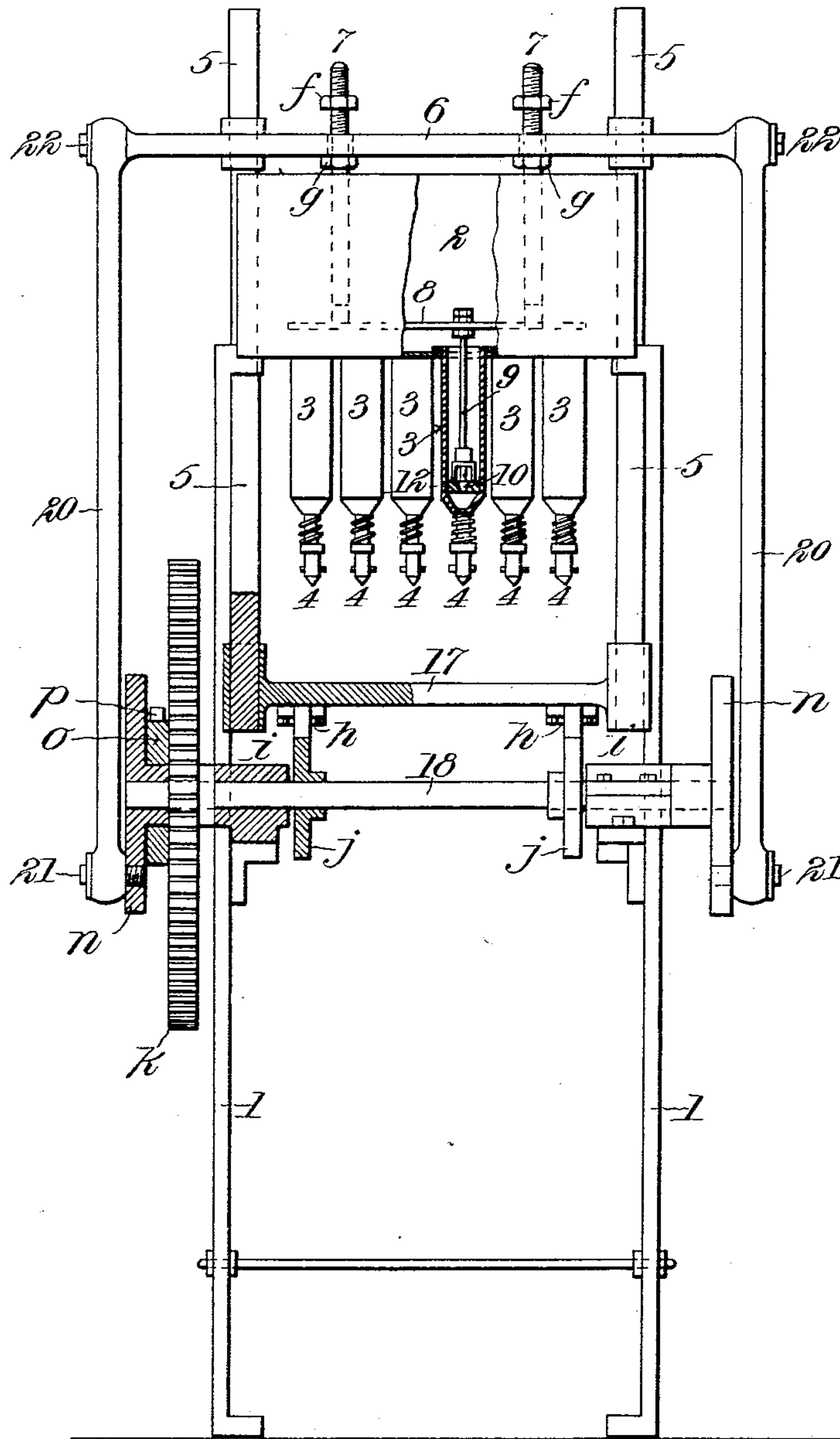
J. E. PRESCOTT.  
FILLING MACHINE.

APPLICATION FILED JUNE 12, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

*Fig. 1.*



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Witnesses

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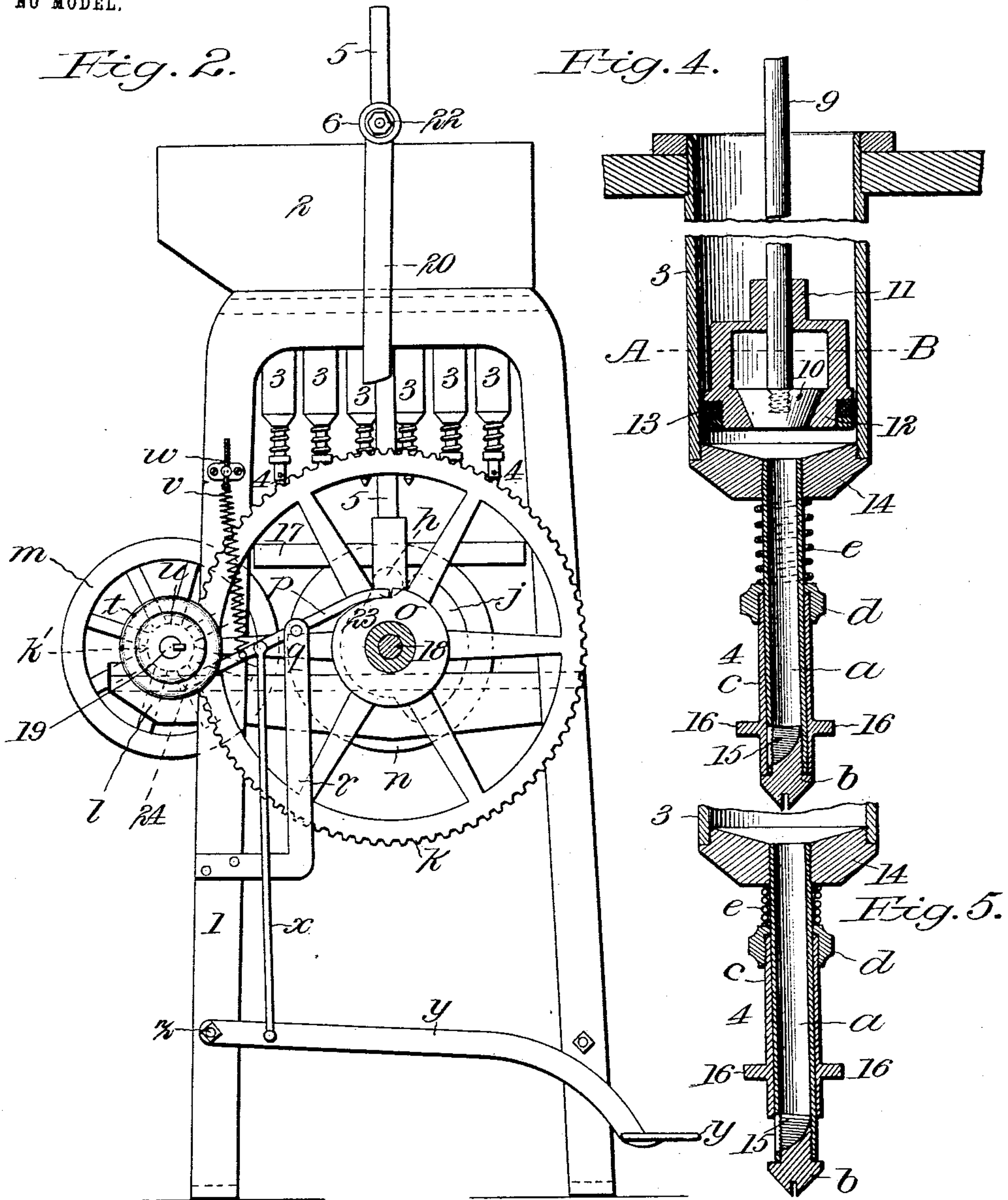
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3 SHEETS—SHEET 2.



*Fig. 3.*  
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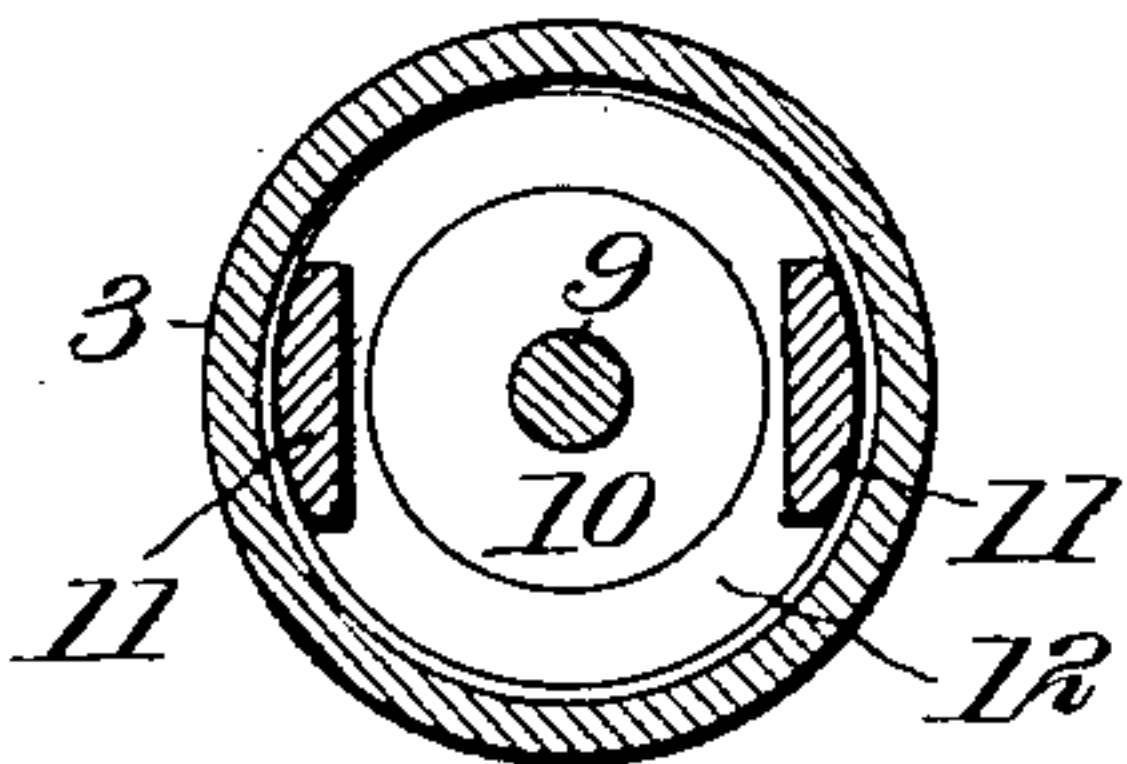
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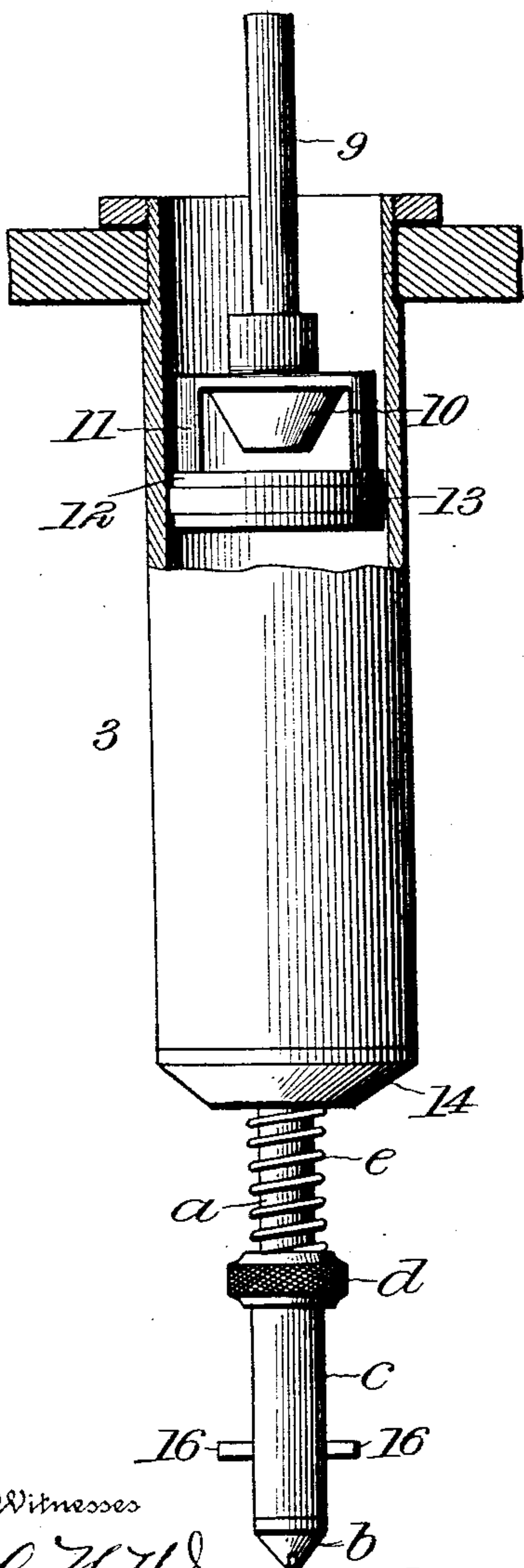
NO MODEL.

3 SHEETS—SHEET 3.

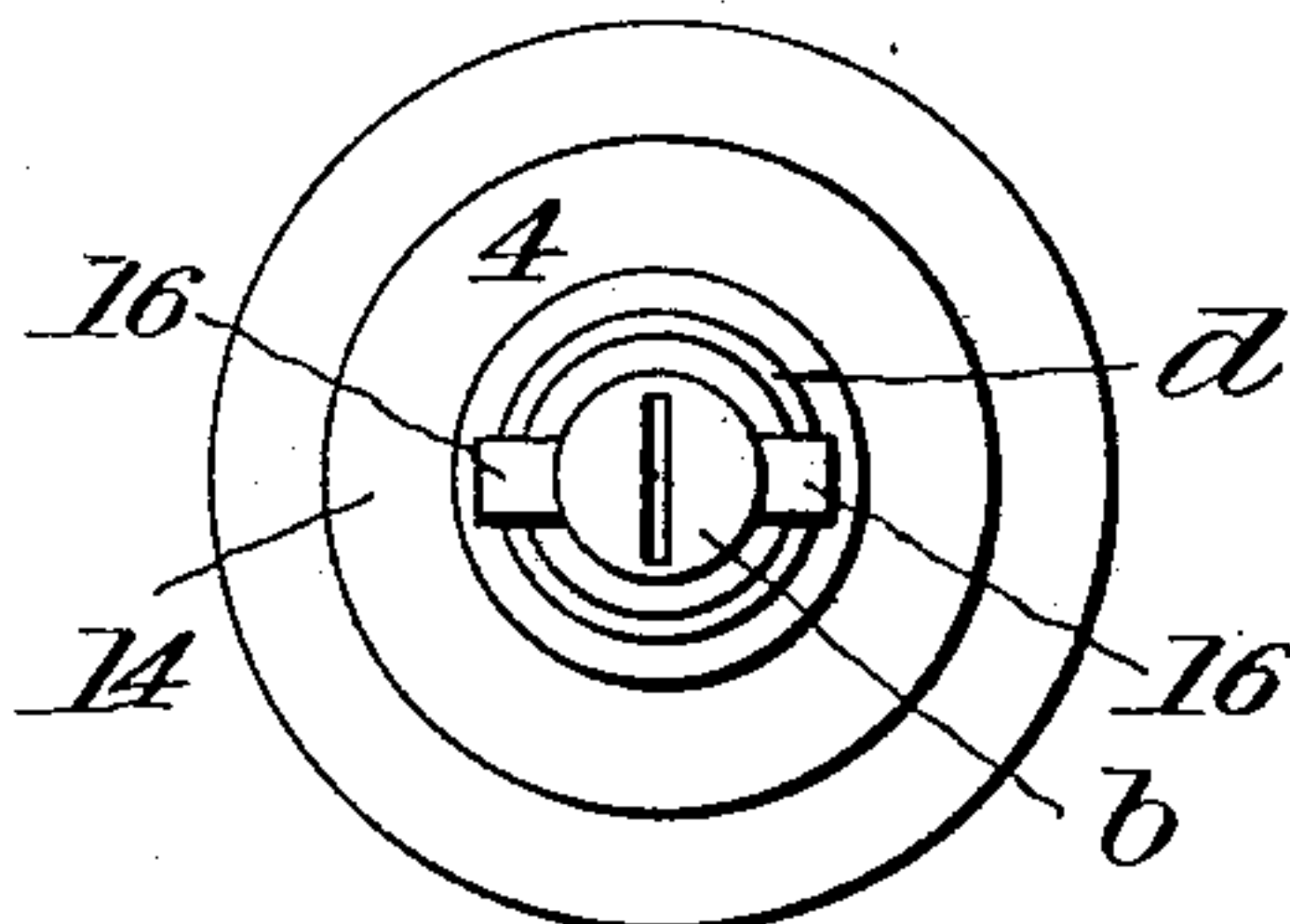
*Fig. 6.*



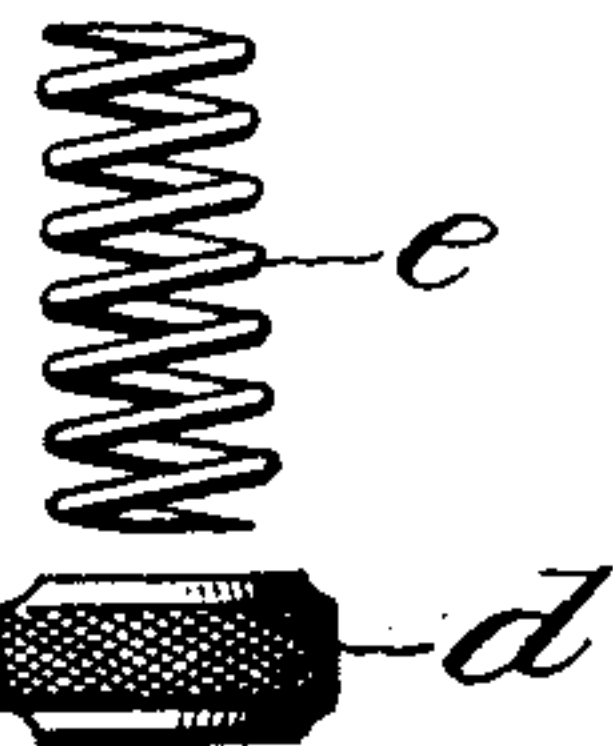
*Fig. 8.*



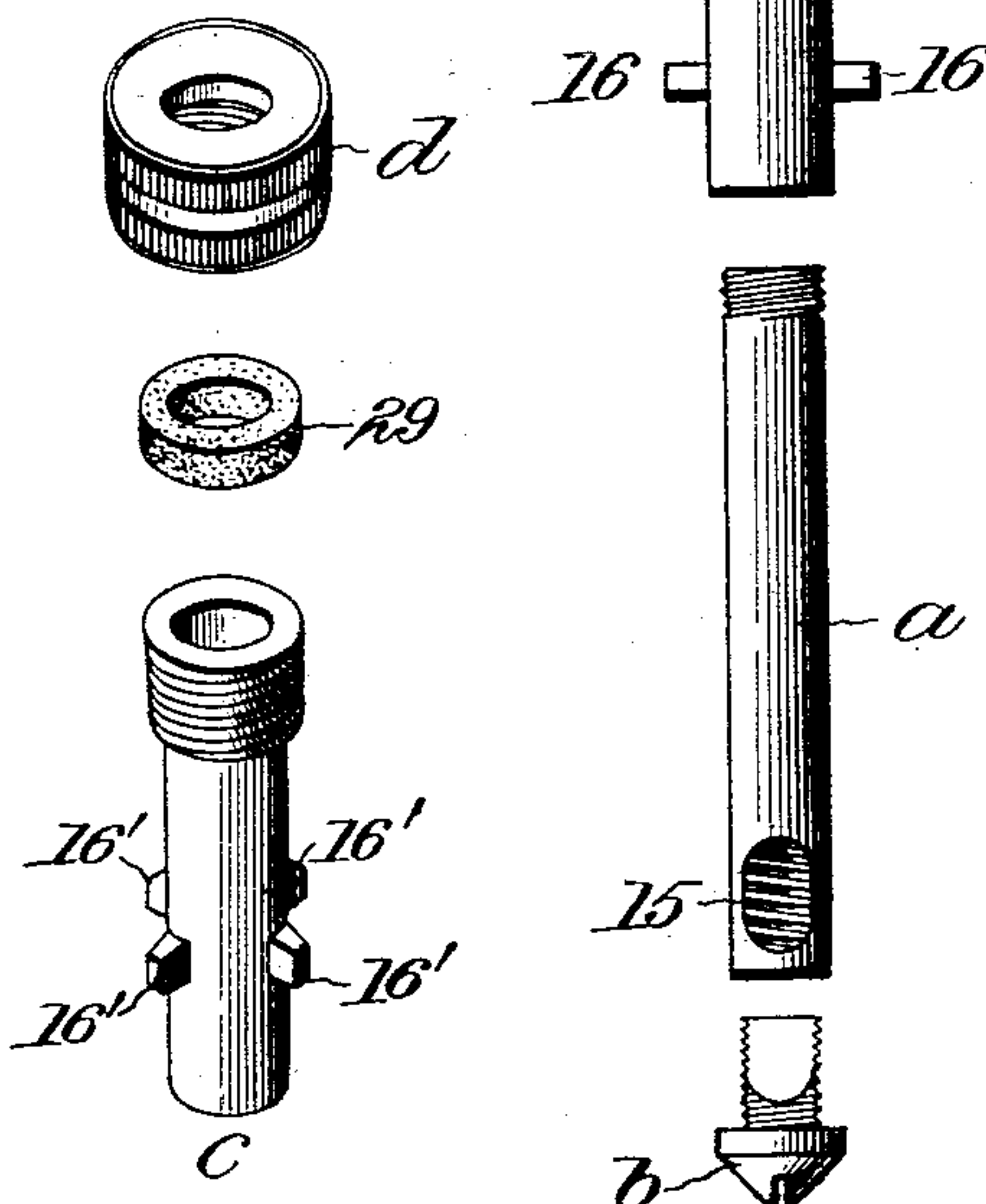
*Fig. 7.*



*Fig. 9.*




*Fig. 10.*



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# UNITED STATES PATENT OFFICE.

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## FILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 751,555, dated February 9, 1904.

Application filed June 12, 1903. Serial No. 161,227. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES EDWARD PRESCOTT, a citizen of the United States of America, and a resident of Passaic, in the State of New Jersey, have invented a new and useful Improvement in Filling-Machines, of which the following is a specification.

This invention relates to machines for filling receptacles with fluid or semifluid substances; and the leading objects of the present invention are to fill cans, bottles, and other like receptacles with measured quantities of such substances with the least possible disturbance of the substance, so as to prevent foaming; to open self-closing cut-offs, and to operate the pistons and valves of the machine by means of mechanism located beneath the receptacle-supporting table, so as to facilitate access to such mechanism and to render the machine compact and free from excessive vibration; to adapt the machine to stop automatically after each filling operation, and to facilitate thoroughly cleaning the parts exposed to the substance.

The present invention relates particularly to improved means for filling bottle-shaped receptacles having comparatively small mouths; and a further object is to provide for the escape of air through the mouth of the receptacle outside of the filling-nozzle and its cut-off device, so as to obviate providing the latter with a contracted air-escape passage, and more particularly to prevent foaming in filling this form of receptacle.

The invention consists in certain novel combinations of parts hereinafter set forth and claimed.

Three sheets of drawings accompany this specification as part thereof.

Figure 1 of the drawings is a front view of the improved machine, partly in section. Fig. 2 is a side view of the machine with portions broken away. Fig. 3 is a fragmentary sectional detail supplemental to Fig. 2. Fig. 4 represents a vertical longitudinal section through one of the measuring-tubes and the attached nozzle closed. Fig. 5 is a fragmentary longitudinal section through the nozzle, showing it open. Fig. 6 represents a cross-section on the line A B, Fig. 4. Fig. 7 is an

end view of the measuring-tube and nozzle.

Fig. 8 is a sectional elevation of these parts, illustrating the measuring operation. Fig. 9 is an elevation of the tube bottom and nozzle parts separated as for cleansing them, and Fig. 10 is a fragmentary sectional elevation illustrating a modification.

Like reference numbers and letters indicate corresponding parts in the several figures.

The parts of the improved machine include a rigid frame 1, a reservoir 2 at the top of said frame, one or more measuring-tubes 3, depending from the bottom of said reservoir within the frame, and a nozzle 4, depending from each measuring-tube.

The improved machine preferably comprises in all cases a number of such measuring-tubes 3, conveniently arranged for simultaneously filling a tray full of receptacles, and the machine will be described as of this construction; but it will be understood that a machine may be constructed on the same principle with a single measuring-tube and its appurtenances.

A pair of cylindrical rods 5, rigidly fastened at mid-length in the frame 1, form pairs of guides by their respective ends and are hereinafter termed "guide-rods." The upper ends of said guide-rods 5 are embraced by collars on a cross-head 6, from which a pair of rods 7, provided with a lost-motion device, depend. The lower ends of these depending rods 7 are attached to a horizontal grid 8, exposed in Fig. 1, and from this grid 8 the stem 9 of a puppet-valve depends in line with the center of each measuring-tube 3. A conical valve 10 is carried by the lower end of each valve-stem 9 within a yoke 11, formed upon a piston 12, fitted to the interior of the tube 3 and constructed with a central aperture forming a seat for said valve 10. Each piston 12, together with the yoke 11 thereon, apart from a suitable peripheral packing 13 of leather or the like, may conveniently be a single metallic casting. The lower end of each measuring-tube 3 is formed by a detachable bottom 14, from the center of which the nozzle 4 depends, and the inner tube *a* of the nozzle is separably fastened to said cap. The lower end of said inner tube *a* is closed by a



point-forming plug *b*, having a tapering head to facilitate the entrance of the nozzle 4 into the mouth of the receptacle and a screw-threaded portion within the tube cut away at one side, so as to render the passage within the tube laterally extending at its lower end, where it connects with an outlet-opening 15 in one side of said inner tube. Said inner tube *a* immediately above the head of said plug *b* is embraced by a slidable sleeve *c*, having ordinarily two or more projections 16 to engage with the lip of the receptacle. The upper end of said sleeve *c* is provided with a flanged nut *d*, the flange of which projects inwardly around the inner tube *a*, and between this flange and the bottom 14 of the measuring-tube 3 above the same a spiral spring *e*, the tension of which is regulated by means of said nut *d*, surrounds the inner tube *a*. Said lost-motion device at the cross-head 6 preferably and conveniently consists of pairs of nuts *f* and *g* on the screw-threaded upper ends of said depending rods 7, whereby the cross-head 6 is adapted to engage with such nuts after more or less lost motion instead of transmitting its movements directly to said depending rods 7. The lower ends of said guide-rods 5 are embraced by sleeves forming part of the horizontal platform of a vertically-movable table 17, the bottom of which is provided with antifriction-rollers *h*. Beneath said table 17 in its lowest position a horizontal rotary shaft 18 is mounted in fixed bearings *i*, attached to the frame 1, and is provided with a pair of cams *j*, upon which said antifriction-rollers *h* rest. A spur-wheel *k*, fast on said shaft 18, is meshed by a pinion *k'*, (shown in Fig. 3,) which is carried by a rotary shaft 19, mounted in fixed bearings *l* at the back of the frame 1 and provided with a belt-pulley *m*, through the medium of which the mechanism is driven from a counter-shaft. (Not shown.) The ends of the shaft 18 first named are provided in common with crank-disks *n*, and the extremities of a pair of connecting-rods 20 embrace wrist-pins 21, carried by said crank-disks, and laterally-projecting pivots 22 at the ends of the cross-heads 6. Upon the hub of one of said crank-disks *n* (shown at the left in Fig. 1) or upon its shaft 18 between the disk and said spur-wheel *k* I mount a notched stop-disk *o*, the notch of which is occupied when the machine is at rest by the dog end 23 of a starting and stopping lever *p*, as shown in Fig. 2. This lever is fulcrumed on a pivot *q* in a bracket *r*, rigidly attached to the frame 1, and its other end 24 projects beneath the driving-shaft 19 and is there constructed with a wedging or cam surface, as shown in Fig. 3, said cam-surface engaging with a matching-surface at the heel end of a clutch-pin 25 to retract said clutch-pin. When it is not thus retracted, said clutch-pin 25 is projected by a spring *s*. Said clutch-pin 25 slides in a guideway cut partly in a col-

lar *t*, fast on the hub of said pinion *k'* and partly in said hub, the pinion being normally loose on said driving-shaft 19. The clutch-pin 25 when projected by its spring *s* interlocks with any one of four or more or less radial notches 26 in the inner face of a collar *u*, fast on said driving-shaft 19. A sufficiently strong spring *v* is stretched from said lever *p* to a bracket *w*, rigidly attached to the frame 1, and is moved against the tension of this spring *v* through the medium of a connecting-rod *x* by a treadle *y*, which is fulcrumed in the frame 1 by a pivot *z*, so as to project at the front of the machine in a position convenient for the operative.

The reservoir 2 may be supplied with the fluid or semifluid substance that is to be filled into the receptacles either continuously under suitable automatic control or periodically by any approved means, and the regularity of its discharge does not depend upon hydrostatic pressure.

With the crank-pins 21 and other moving parts in the positions in which they are shown in Figs. 1, 2, and 3 the machine from its pinion *k'* is at rest with the several pistons 12 at the lower ends of the measuring-tubes 3, as shown in section in Fig. 1 and as shown in Fig. 4, and the outlets 15 of the nozzles 4 are closed, as seen in the figure last named, preparatory to the operation of filling the measuring-tubes. The pressure of the foot on the treadle *y* lifts the dog end 23 of the starting and stopping lever *p* and retracts its cam end 24, permitting the clutch-pin 25 to interlock with the fast collar *u* on the driving-shaft 19, which starts the mechanism. Said lost-motion device at the cross-head 6 relieves the crank-disks *n* of any work at the moment when they are passing their lower dead-centers. Immediately thereafter the cross-head 6 comes into contact with the upper nuts *f* of the lost-motion device, and an upward movement of the several valves 10 takes place. A moment later the valves 10 come into contact with the tops of the yokes 11 on the pistons 12, and the valves and pistons then move together, the substance within the measuring-tubes above the pistons flowing through the valve-seats and preventing any vacuum beneath the pistons as they rise. When the pistons 12 have reached the uppermost limit of their movement, the measuring-tubes contain beneath the pistons a proper quantity of the substance to fill receptacles of the standard size. Meanwhile a tray filled with such receptacles has been placed upon the sliding table 17, so that the several receptacles are beneath and in line with the respective nozzles 4, and at the proper moment, as determined by the configuration or adjustment of the cam *j*, the table 17, and therewith the receptacles, has been moved upward until the lips of the receptacles embrace the lower ends of the nozzles 4. Said lips now come into contact with said lateral projections 16 on



the nozzle-sleeves *c*, and pressing these sleeves and their nuts *d* upward against the resistance of the superjacent springs *e* open the outlets 15 of the nozzles 4, as in Fig. 5. Such lost-motion device *f* 6 *g* now performs its principal functions in permitting the valves by the weight of the connections between the valves and the cross-head to descend gently until they are well seated and to permit the receptacles as raised by the cams *j* to fully open the nozzle-outlets 15, as above described, before the downward movement of the pistons 12 by means of the crank-disks *n* is begun. The effect of this downward movement of the pistons 12 is to expel the contents of the measuring-tubes 3 through the open outlets 15 of the nozzles 4 into the receptacles beneath without any liability to cause the substance to foam. The air within the receptacles escapes freely around the nozzles 4, as there is no occasion to make them fit the mouths of the receptacles closely. After the pistons 12 have again reached their lowest limit, as in Figs. 1 and 4, the table 17 is dropped by means of the cams *j*, so that the tray filled with full receptacles may be freely removed beneath the nozzles 4, and the machine is automatically stopped by the interlocking of the dog end 23 of the spring-pressed starting and stopping lever *p* with the notch of the stop-disk *o* and the retraction of the clutch-pin 25 by the cam end 24 of said lever, so as to facilitate removing said tray and introducing another tray filled with empty receptacles upon the table 17.

The operation above described may thus be repeated as long as there is any of the substance in the reservoir 2 or measuring-tubes 3, and the construction of the nozzles 4 and their appurtenances as above described provides for taking them apart and thoroughly cleansing the pistons 12 and their valves 10, as well as the interior of the measuring-tubes 3 and nozzles 4, with the utmost facility.

After draining the reservoir 2 and measuring-tubes 3 and detaching the connecting-rods 20 all the pistons 12 and valves 10 may be removed and replaced simultaneously by means of the cross-head 6 and the connections between said cross-head 6 and the valves 10. The valves 10 may then be unscrewed from the valve-stems 9, and the pistons 12 may be taken apart, if so desired. The bottom 14 of each measuring-tube 3, and therewith the subjacent nozzle 4, may then be detached by unscrewing the former, and the nozzle parts *a*, *b*, *c*, *d*, and *e* may be separated from said bottom 4 and from each other, as in Fig. 8, by unscrewing the point *b* and inner tube *a*, or it may usually suffice to unscrew said point *b* alone.

The construction and arrangement of the mechanism whereby the valves 10 and pistons 12 are reciprocated and the receptacle-supporting table 17 is raised and lowered locate the shafting 18 and 19 of the machine as near

the floor as practicable, equally distribute the strain, and reduce the wear as compared with previous constructions.

The quantity of the substance discharged at each operation from each measuring-tube 3 may be regulated by raising or lowering the upper nuts *f* of the lost-motion device so as to reduce or increase the extent of the upward movement of the valves 10, and therewith the pistons 12, relatively to the measuring-tubes.

To provide for filling flat-topped cans and other forms of receptacles, the lip-engaging projections 16 may give place to other forms of sleeve-retracting devices 16', as illustrated by Fig. 10, and, as illustrated by the same figure, the nozzle-sleeve nuts *d* may preferably be adapted by suitably-enlarged bores to hold in place leakage-preventing packing 29, of wicking or the like, at the upper end of each of the nozzle-sleeves *c*.

The treadle *y* may, if preferred, be located within the frame 1 convenient to the right foot of the operative and connected by bell-cranks and rods with the stopping and starting lever *p*, and other like modifications will suggest themselves to those skilled in the art.

Having thus described said improvement, I claim as my invention and desire to patent under this specification—

1. A filling-machine comprising an elevated reservoir, measuring-tubes depending from said reservoir and in communication therewith, self-closing nozzles depending from said measuring-tubes and comprising slidable sleeves, pistons within said measuring-tubes, valves whereby the substance is admitted beneath said pistons, means for operating said pistons and valves and means for lifting the receptacles to slide back said sleeves and admit the substance into the receptacles, substantially as hereinbefore specified.

2. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir, a measuring-tube depending from said reservoir and in communication therewith, and a separable self-closing nozzle depending from said measuring-tube, said measuring-tube having a detachable bottom, and said nozzle comprising an inner tube attached centrally to said bottom and in communication with the interior of said measuring-tube, a detachable point assisting to form the outlet of said inner tube, a slidable sleeve embracing said inner tube above said point, a flanged nut embracing the upper end of said sleeve, and a spring compressed more or less between said nut and said bottom, substantially as hereinbefore specified.

3. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir, a measuring-tube depending from said reservoir and in communication therewith, a removable and separable valve and piston within said tube, and a separable self-closing nozzle depending from said



measuring-tube, said measuring-tube having a detachable bottom, and said nozzle comprising an inner tube attached centrally to said bottom and in communication with the interior of said measuring-tube, a detachable point assisting to form the outlet of said inner tube, a slidable sleeve embracing said inner tube above said point and provided with lateral projections, a flanged nut embracing the upper end of said sleeve, and a spring compressed more or less between said nut and said bottom, substantially as hereinbefore specified.

4. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir for the substance, measuring-tubes depending from said reservoir and in communication therewith, pistons and valves for admitting the substance beneath the pistons within said tubes, self-closing nozzles depending from said tubes, and means for operating said pistons and valves and for opening said nozzles, including a subjacent horizontal shaft carrying a pair of crank-disks and a pair of cams, means for rotating said shaft, connections between said crank-disks and said valves and pistons, and a horizontal table raised and lowered by means of said cams, substantially as hereinbefore specified.

5. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir for the substance, measuring-tubes depending from said reservoir and in communication therewith, pistons and valves for admitting the substance beneath the pistons within said tubes, self-closing nozzles depending from said tubes and means for operating said pistons and valves and for opening said nozzles including a subjacent horizontal shaft carrying a pair of crank-disks and a pair of cams, means for rotating said shaft, connections between said crank-disks and said valves and pistons, and a horizontal table provided on its under side with antifriction-rollers resting upon said cams, substantially as hereinbefore specified.

6. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir for the substance, measuring-tubes depending from said reservoir and in communication therewith, pistons and valves for admitting the substance beneath the pistons within said tubes, self-closing nozzles depending from said tubes, and means for operating said pistons and valves and for opening said nozzles including a subjacent horizontal shaft provided with crank-disks at its ends and with a pair of cams, means for rotating said shaft, a cross-head above said reservoir, connections between said crank-disks and said cross-head, a horizontal table beneath the nozzles raised and lowered by said cams, a pair of guide-rods, the respective ends of which serve as guides for said cross-head and said table, and a rigid frame within which said

guide-rods, are fastened at mid-length, substantially as hereinbefore specified.

7. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir for the substance, measuring-tubes depending from said reservoir and in communication therewith, pistons and valves for admitting the substance beneath the pistons within said tubes, self-closing nozzles depending from said tubes and means for operating said pistons and valves and for opening said nozzles including a subjacent horizontal shaft carrying a pair of crank-disks and a pair of cams, means for rotating said shaft, connections between said crank-disks and said valves and pistons, a horizontal table raised and lowered by means of said cams, and connections between said cross-head and said pistons and valves, including a lost-motion device, substantially as hereinbefore specified.

8. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir for the substance, measuring-tubes depending from said reservoir and in communication therewith, pistons and valves for admitting the substance beneath the pistons within said tubes, self-closing nozzles depending from said tubes, and means for operating said pistons and valves and for opening said nozzles including a subjacent horizontal shaft carrying a pair of crank-disks and a pair of cams, means for rotating said shaft, connections between said crank-disks and said valves and pistons, a horizontal table raised and lowered by means of said cams, and connections between said cross-head and said pistons and valves, including a lost-motion-regulating device consisting of a pair of nuts above and below said cross-head upon the screw-threaded upper ends of rods depending from said cross-head and extending therethrough, substantially as hereinbefore specified.

9. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir for the substance, measuring-tubes depending from said reservoir and in communication therewith, pistons and valves for admitting the substance beneath the pistons within said tubes, self-closing nozzles depending from said tubes, mechanism for operating said pistons and valves and for opening said nozzles including a subjacent horizontal shaft and a driving-shaft adjacent thereto, gearing to connect said shafts, a clutch for connecting said gearing and said driving-shaft, a stop-disk on said subjacent shaft, a starting and stopping lever having its respective ends adapted to interlock with said disk and to unclutch said gearing, a spring holding said lever in its interlocked position, and means for reversing said lever to start said mechanism.

10. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir for the substance,



measuring-tubes depending from said reservoir and in communication therewith, pistons and valves for admitting the substance beneath the pistons within said tubes, self-closing nozzles depending from said tubes, mechanism for operating said pistons and valves and for opening said nozzles including a subjacent horizontal shaft and a driving-shaft parallel therewith, spur-gearing to connect said shafts, a clutch for connecting said gearing with said driving-shaft, a stop-disk on said subjacent shaft, a starting and stopping lever having its respective ends adapted to interlock with said disk and to unclutch said gearing, a spring holding said lever in its interlocked position, and means for reversing said lever to start said mechanism.

11. The combination, in a machine for filling receptacles with a fluid or semifluid substance, of an elevated reservoir for the substance, measuring-tubes depending from said reser-

voir and in communication therewith, pistons and valves for admitting the substance beneath the pistons within said tubes, self-closing nozzles depending from said tubes, mechanism for operating said pistons and valves and for opening said nozzles including a subjacent horizontal shaft and a driving-shaft parallel therewith, spur-gearing to connect said shafts, a clutch for connecting said gearing and said driving-shaft, a stop-disk on said subjacent shaft, a starting and stopping lever having its respective ends adapted to interlock with said disk and to unclutch said gearing, a spring holding said lever in its interlocked position, and a treadle and connections for reversing said lever to start said mechanism, substantially as hereinbefore specified.

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