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PATENTED NOV. 12, 1907.

E. P. JOHNSON & C. I. LEE.

GAS ENGINE GOVERNOR.

APPLICATION FILED MAY 2, 1906.

3 SHEETS—SHEET 1.

Fig. 2.

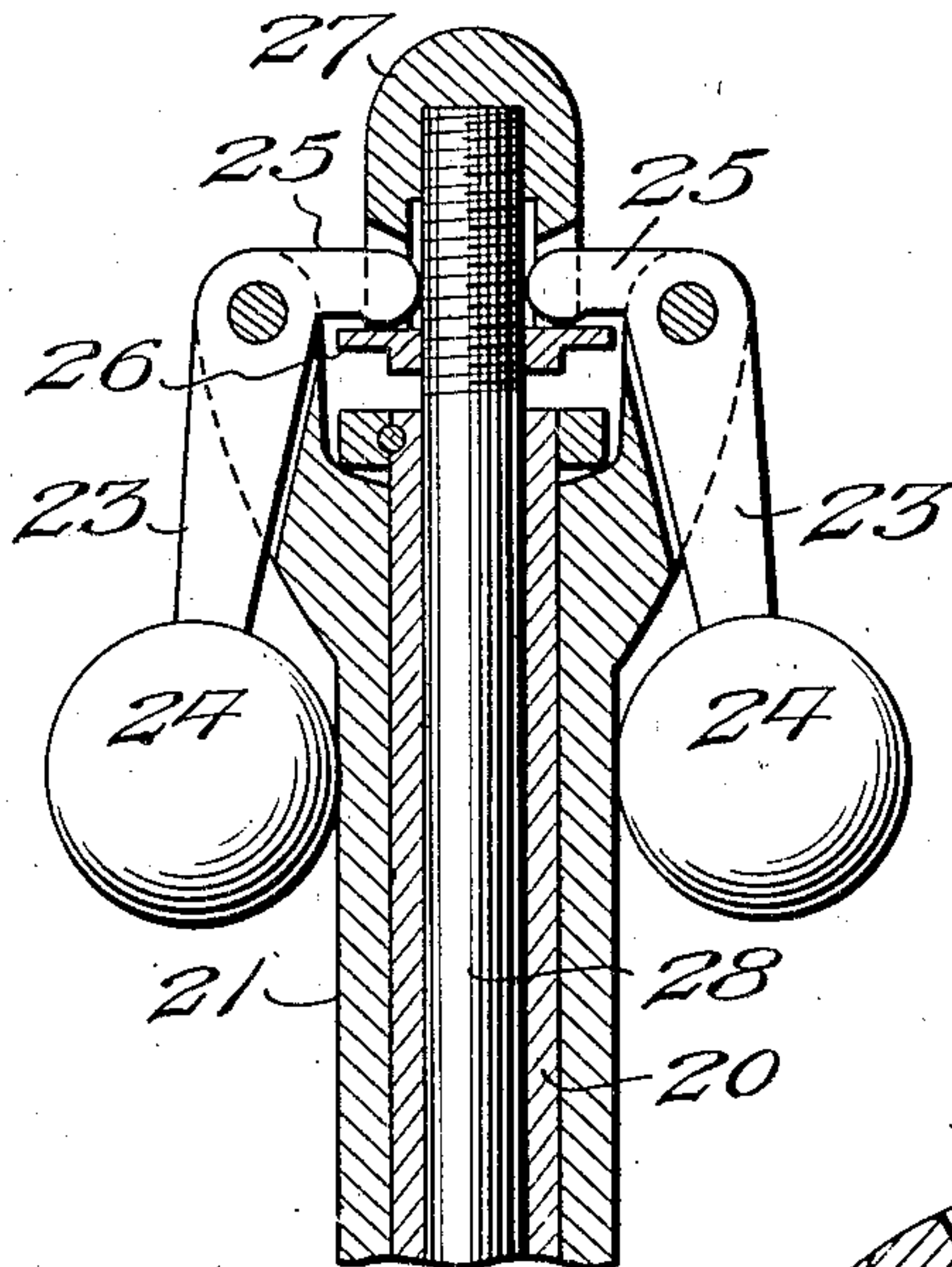
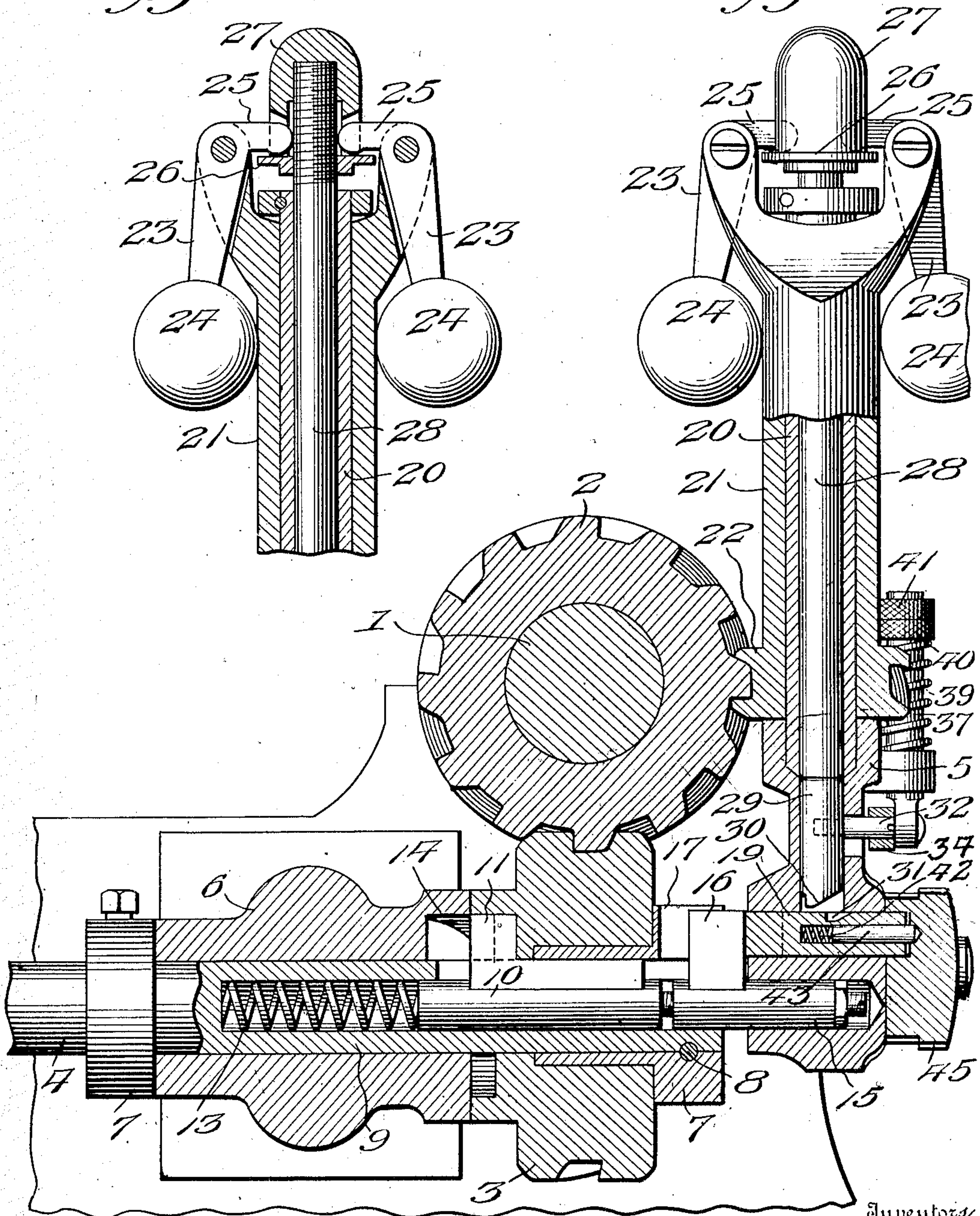


Fig. 1.



Witnesses

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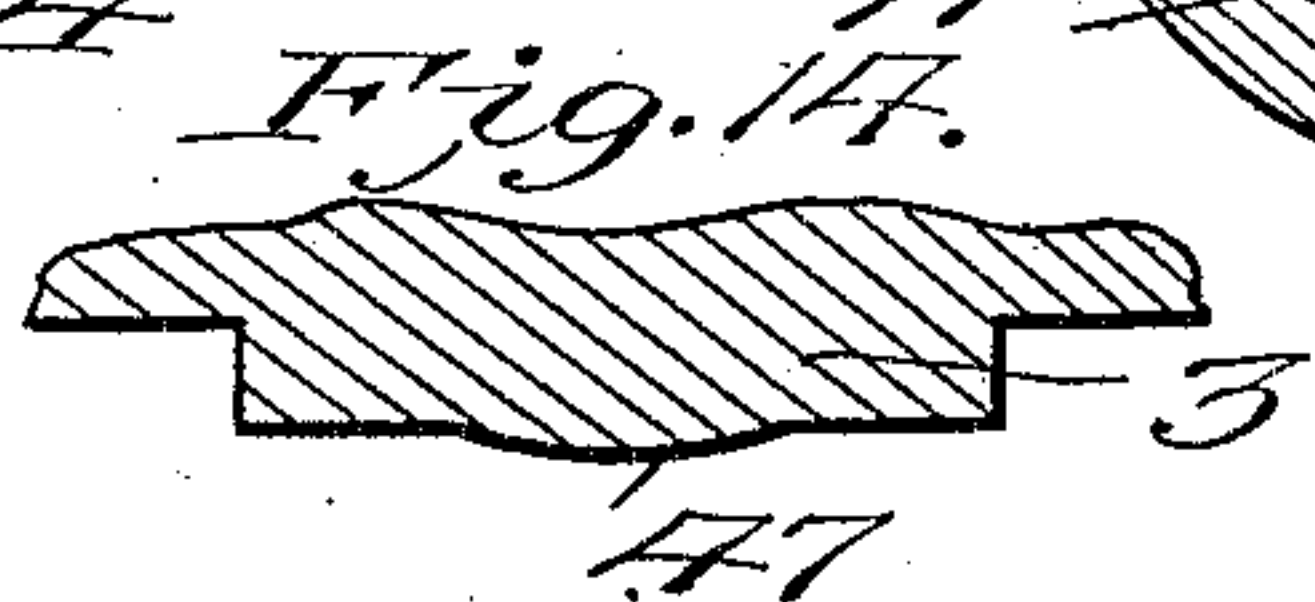
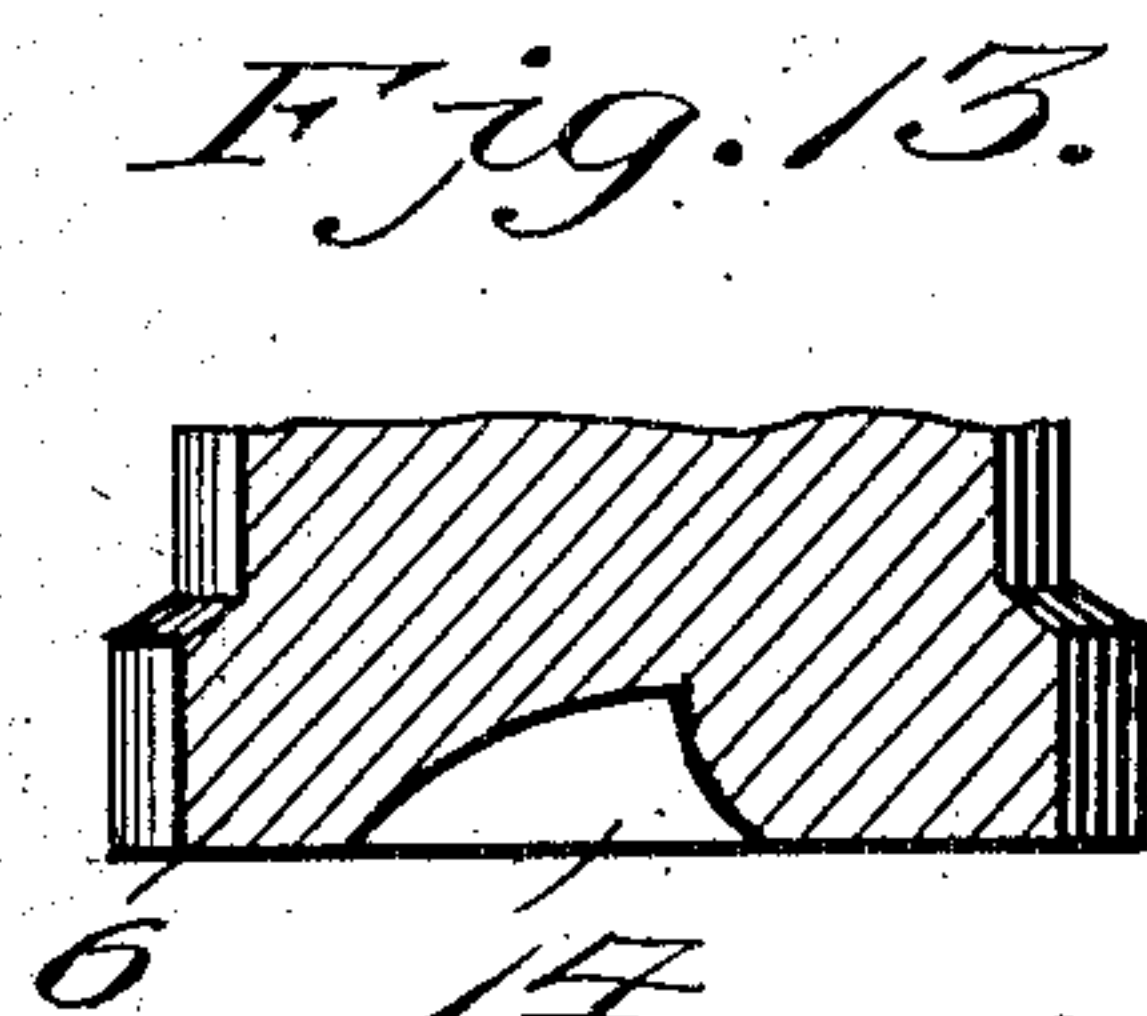
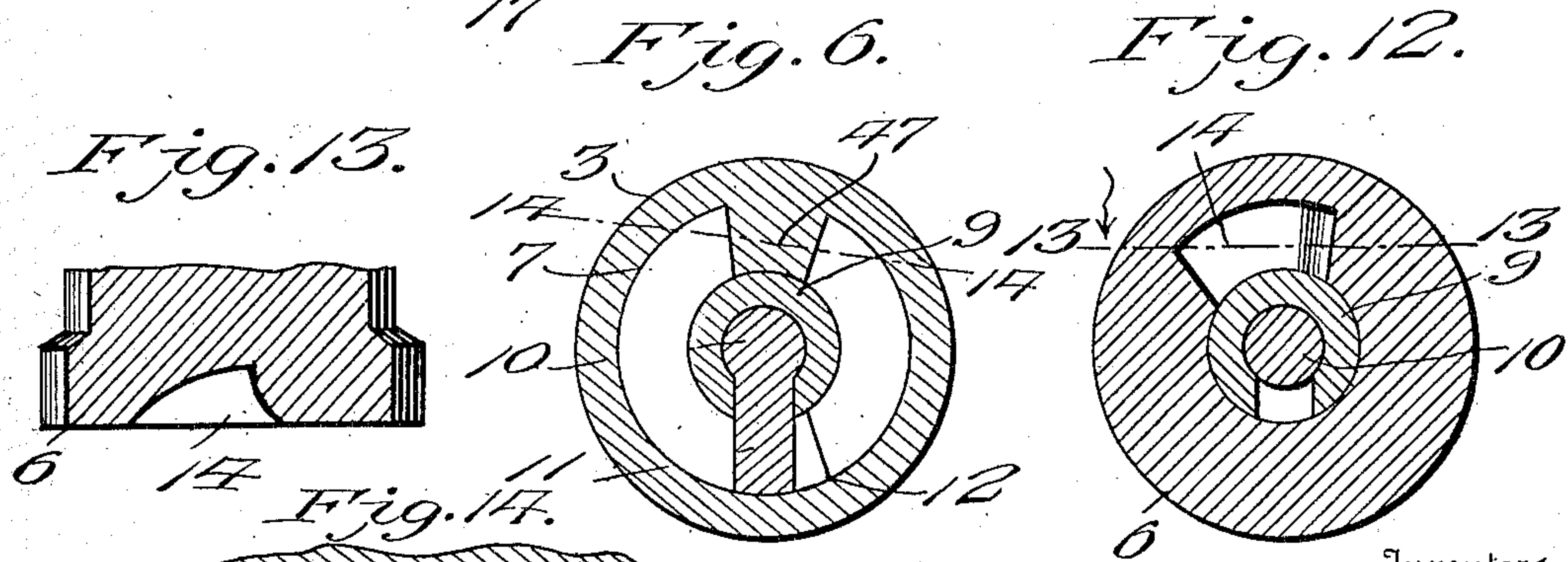
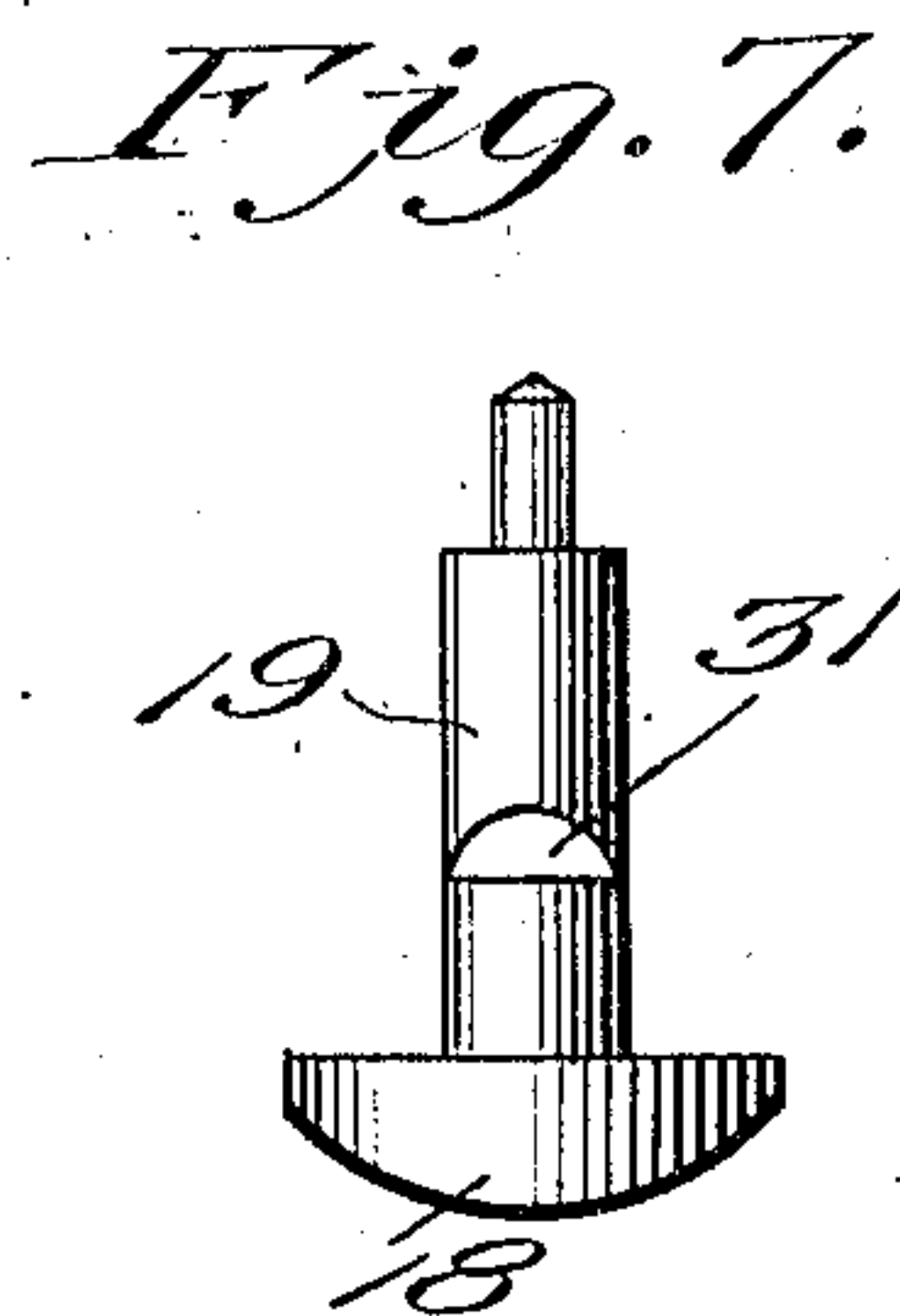
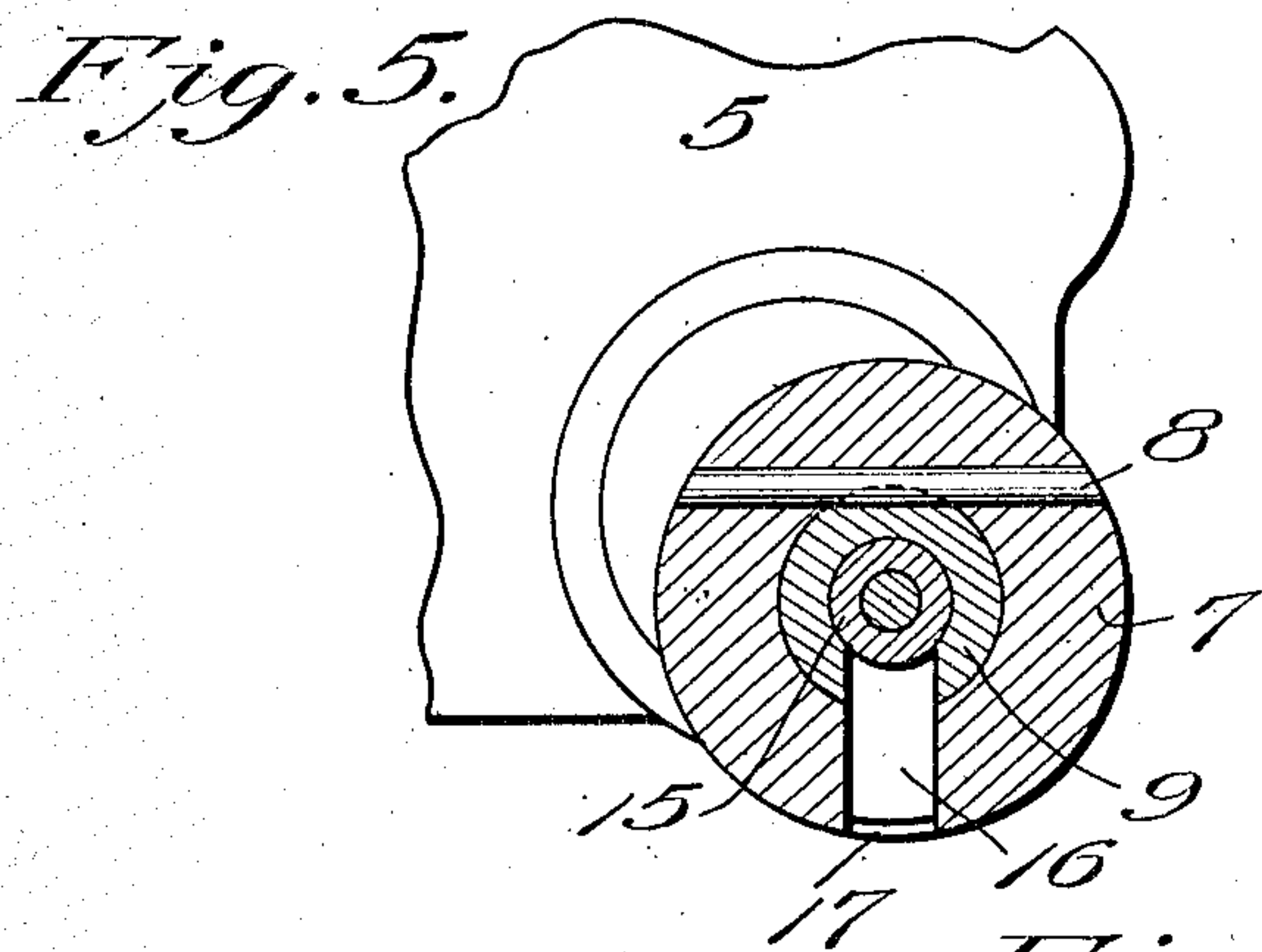
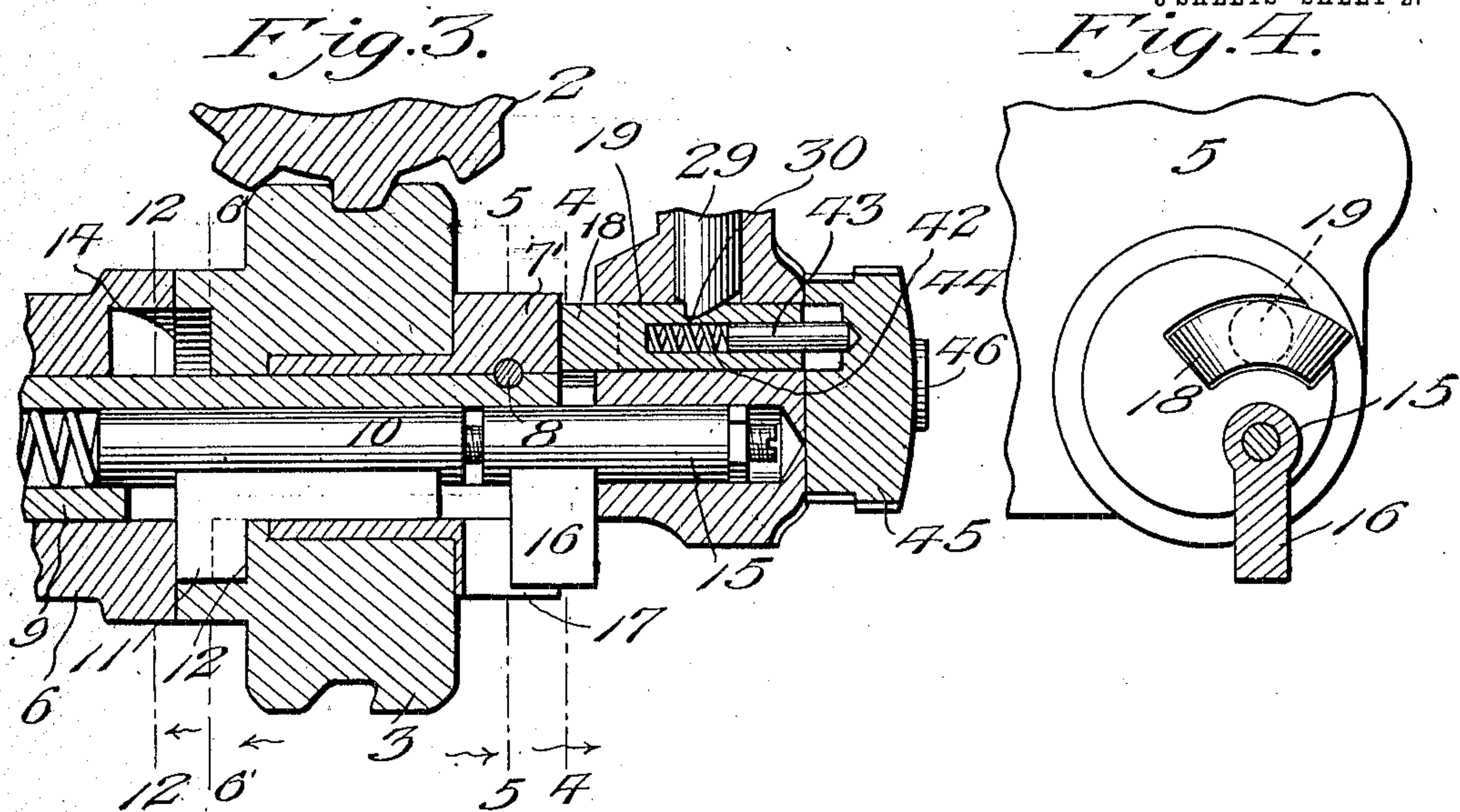
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3 SHEETS—SHEET 2.



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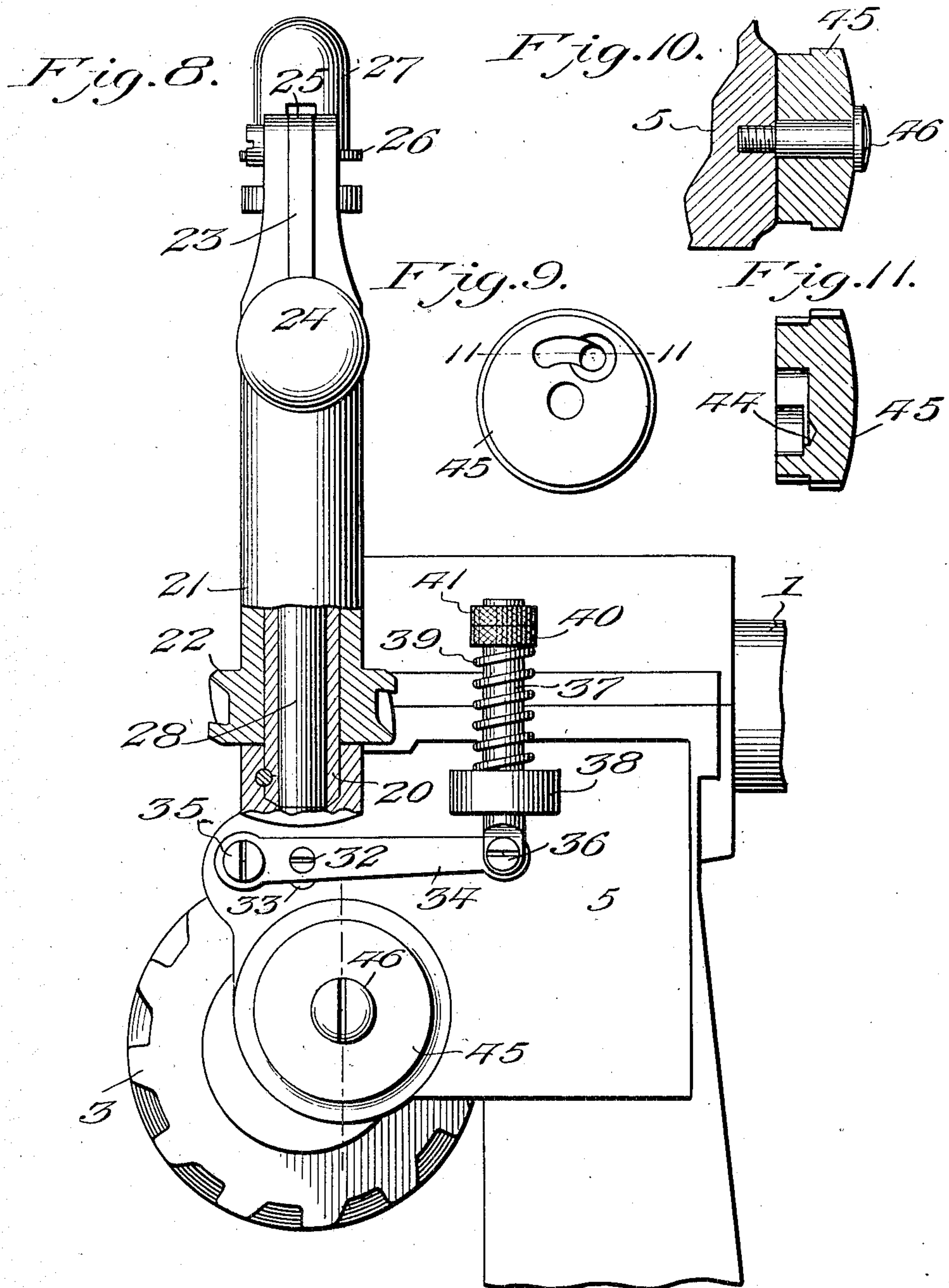
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GAS ENGINE GOVERNOR.

APPLICATION FILED MAY 2, 1906.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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GAS-ENGINE GOVERNOR.

No. 870,629.

Specification of Letters Patent.

Patented Nov. 12, 1907.

Application filed May 2, 1906. Serial No. 314,794.

To all whom it may concern:

Be it known that we, EUGIE P. JOHNSON and CHESTER I. LEE, citizens of the United States, residing at Hartsells, in the county of Morgan and State of Alabama, have invented new and useful Improvements in Gas-Engine Governors, of which the following is a specification:

This invention relates to gas engine governors, the object of the invention being to provide a governor especially designed for use in connection with explosive gas engines, whereby provision is made for automatically stopping the cam shaft with a positive action when an excessive speed is attained by the engine shaft; secondly, to locate the stopping device in such position as to hold the exhaust valve open and the electrodes apart while the cam shaft is not in motion; third, to provide for changing the speed of the engine while the same is in operation; fourth, to provide for stopping the engine by a hand device which throws into operation the automatic devices referred to, which has the effect of preventing the explosive mixture from entering the cylinder or cylinders, and also breaking the electrical circuit so as to avoid the possibility of igniting a charge remaining in any one or more of the cylinders; fifth, to provide for holding the cam shaft in such position that the exhaust valve is open, thereby allowing for the ingress and egress of air to and from the cylinder or cylinders until a sufficient motion of the fly wheel has been obtained to compress the charges in the cylinders before such charges are admitted.

With the above and other objects in view, the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the accompanying drawings, Figure 1 is a sectional view of the automatic governor mechanism of this invention. Fig. 2 is a section through the governor head. Fig. 3 is a detail section similar to the lower portion of Fig. 1, showing the different position of the parts involved. Fig. 4 is a vertical cross-section on the line 4—4 of Fig. 3. Fig. 5 is a vertical cross-section on the line 5—5 of Fig. 3. Fig. 6 is a vertical cross-section on the line 6—6 of Fig. 3. Fig. 7 is a plan view of the latch. Fig. 8 is a face view of the mechanism, the same being partly broken away. Fig. 9 is an inside face view of the latch setting or throwing head. Fig. 10 is a sectional view of the same, taken in line with the pivot bolt or screw thereof. Fig. 11 is a sectional view of the latch throwing head, taken on the line 11—11 of Fig. 9. Fig. 12 is a vertical cross-section on the line 12—12 of Fig. 3. Fig. 13 is a section on the line 13—13 of Fig. 12. Fig. 14 is a sectional detail on the line 14—14, Fig. 6.

Referring to the drawings, 1 designates the engine shaft which, in carrying out the present invention, is

provided with a driving worm wheel 2 fast thereon and meshing with a driven worm wheel 3 on the cam shaft 4 which operates the intake and exhaust valves and an ignition apparatus of an ordinary gasoline engine, the parts last referred to not being shown in the accompanying drawings but being of the ordinary construction well known to those familiar with the art to which this invention appertains.

The operative parts and bearings of the mechanism constituting the governor of this invention are all mounted upon and carried by a bracket or frame plate 5 secured to the engine bed or other suitable support, said bracket or frame plate carrying a box 6 in which the cam shaft 4 is journaled, as shown in Fig. 1, and provided with a stop collar 7 to prevent end-thrust of said cam shaft.

Mounted upon the shaft 4 is a collar 7' keyed thereto, as shown at 8, so as to revolve therewith. The shaft 4, for a portion of its length, is made tubular or provided with a central longitudinal bore 9 in which is slidingly mounted a key 10 having an integral radially projecting lug 11 which, at one end of its throw, is received in a notch 12 in the wheel 3, as shown in Figs. 1 and 3. The lug 11 is normally held in engagement with the notch 12 of the wheel 3 by means of a key-thrust spring 13 contained within the bore 9 of the shaft 4, as best shown in Fig. 1, said spring being compressible lengthwise to allow the lug 11 to move out of engagement with the notch 12 and into engagement with a notch 14 in the stationary bearing box 6 for the purpose of locking the cam shaft 4 and preventing its rotation. Mounted beyond and in line with the key 10 is a second sliding key 15 having a radially projecting lug 16 which works back and forth in a slot or way 17 in the collar 7', as shown in Figs. 1 and 3, said lug, in the rotation of the shaft 4, coming in contact with the cam-shaped head 18 of a sliding latch 19 mounted in a suitable bearing opening in the frame plate or bracket by which the governor is supported, the said lug 16 cooperating with the head of the latch so as to move said latch lengthwise to reciprocate the same once in each revolution of the cam shaft when said latch is free.

Extending upward from the frame-plate or bracket 5 is a governor post 20 around which is placed a governor sleeve 21 having a worm gear wheel 22 which meshes with and is driven by the worm wheel 2 on the engine shaft. At its upper end, the sleeve 21 has pivotally mounted thereon the governor arms 23 carrying the balls or weights 24 at their outer ends and having elbow extensions 25 which bear against the flange or annular shoulder 26 of a head 27 carried by the upper end of a presser-rod or stem 28 which extends downward through the governor post 20 and has its lower end arranged to bear against the upper extremity of a sliding catch 29.

The catch 29, which is movable up and down in a suitable bearing opening in the frame-plate or bracket,

is provided at its lower end with a catch lip or shoulder 30 which is adapted to enter a lock notch 31 in the adjacent side of the latch 19, as clearly shown in Figs. 2 and 3, the latch being shown free in Fig. 1, while it is shown locked by the catch 29 in Fig. 3. The catch 29 is provided with a radially projecting pin 32 which works in a slot 33 in the bracket and having its free end pivotally connected at 36 to a tension device consisting of a rod or stem 37 movable up and down through a guide 38 on the frame, the lever 34 being normally held upward by means of a tension spring 39 which encircles the rod or stem 37 and is confined between the stationary guide 38 and an adjustable collar or nut 40 threaded upon the stem 37. By means of the adjustable collar 40, the tension of the spring 39 may be regulated to afford the necessary resistance to the downward movement of the catch 29, the speed at which the engine runs and at which it will automatically throw the cam shaft out of operation, being regulated by moving the nut 40 to increase or diminish the tension of the spring. 41 designates a lock nut for maintaining the adjustment of the nut 40.

The latch 19 is provided in its rear end with a longitudinal bore or recess in which is mounted a thrust spring 42 backed up by a latch setting pin 43, the outer end of which is received in a groove 44 extending part way around the inner surface of a latch setting or throwing head 45 which is mounted to turn on a stud or bearing-screw 46 connected with the bracket or frame 5, as shown in Fig. 10. It will be understood that by turning the head 45, the latch is held in the same position as when locked by the catch 29 as shown in Fig. 3.

The operation of the machine is as follows. When the speed of the engine becomes too high, the governor arms 23 are moved upward sufficiently to depress the presser-rod 28 and cause the catch-lip 30 thereof to enter the notch 31 of the latch 19 when said latch moves inward. This causes the cam-shaped head 18 of the latch to protrude, and in view of the fact that the latch is held locked by the catch 29, the lug 16 in the rotation of the cam-shaft, comes in contact with said head and as the latch cannot give outward, the key 15 is moved inward and, by coming in contact with the key 10, forces the said key inward against the tension of the spring 13, thus moving the lug 11 out of engagement with the notch 12. This unlocks the wheel 3 from the shaft 4 and, at the same time, locks the shaft 4 to the bearing box 6 in position to hold the exhaust valve of the engine open. The wheel 3 continues to revolve with the wheel 2 until the speed of the engine decreases, whereupon, a cam-shaped lug 47 on the worm wheel 3 comes in contact with lug 11 on key 10 forcing it just a little against the tension of spring 13 for the purpose of taking the strain off of catch lip 30, thereby allowing spring 39 to draw catch 29 out of engagement with notch 31 in latch 19, when the speed of the engine decreases to that extent that the governor arms 23 descend and permit the presser rod 28 to move upward. The thrust spring 13 then moves the keys 10 and 15 outward, carrying the lug 11 out of locking engagement with the box 6 and into locked engagement with the notch 12 of the wheel 3. Thus, the wheel 3 is again clutched or locked to the cam shaft 4

and the operation of the engine is continued, as before. By adjusting the tension of the spring 39 in the manner hereinabove described, the speed at which the engine will automatically throw the cam-shaft out of operation and lock it against rotation is determined.

I claim:

1. The combination with the rotary shaft of a gas engine, of a cam-shaft for controlling the valve mechanism, co-acting gears on said shafts, a sliding spring seated key adapted to lock one of said gears to the cam-shaft and unlock the same, a latch for throwing said key, and a governor operating upon the attainment of a certain speed to lock said latch in position to shift the key against the tension of said spring, and disconnect the gear wheel on the cam-shaft.

2. The combination with the rotary shaft of a gas engine, of a cam-shaft for controlling the valve mechanism, inter-meshing gears on said shafts, a governor geared to the engine shaft and driven thereby, a sliding key movable in one direction by a spring and shiftable to connect the cam-shaft with its gear or with a stationary abutment, a latch for shifting said key, and a latch controlled by the governor for locking the latch in position to shift the key.

3. The combination with the rotary shaft of a gas engine, of a cam-shaft for controlling the valve mechanism, inter-meshing gears on said shafts, a governor geared to the engine-shaft, a shiftable key carried by the cam-shaft in one position to lock the gear of said shaft thereon and in another position to disconnect said gear from the cam-shaft, a thrust-spring operating to force said key in one direction, a latch for shifting the key, and a self-retracting catch adapted to be thrown by the governor into holding engagement with the latch for positioning said latch to shift the key.

4. The combination with the rotary shaft of an engine, of a cam-shaft for controlling the valve mechanism, inter-meshing gears on said shafts, a shiftable key for throwing one of the gears into and out of engagement with the cam-shaft, a governor geared to the engine shaft, a latch for shifting the key, and means actuated by the cam-shaft and adapted to be actuated by the latch for shifting the key, a spring for thrusting the latch into operative position for shifting the key, and a catch operated by the governor for holding the latch in position to shift the key.

5. The combination with the rotary shaft of an engine, of a cam-shaft for controlling the valve mechanism, inter-meshing gears thereon, a shiftable key for connecting one of said gears to the cam-shaft and disconnecting the same therefrom, a key thrusting spring seated in the cam-shaft, a latch for throwing the key shifting device, means for urging the latch to a position where it will operate upon the key shifting device, a catch operated by the governor for locking and unlocking the latch, means for resisting the movement of the catch toward its locking position, and means for adjusting the degree of resistance of said catch.

6. The combination with the rotary shaft of an engine, of a cam-shaft for controlling the valve mechanism, inter-meshing gears on said shafts, a shiftable key for connecting one of said gears to and disconnecting the same from the cam-shaft, a key-shifting device actuated by the cam-shaft, a self-positioning latch for actuating the key shifting device, a governor geared to the engine shaft, a self-retracting catch adapted to be thrown by the governor into locked engagement with the latch, and manually operable means adjustable while the engine is in motion for varying the degree of resistance of the catch to the force applied thereto by the governor, substantially as described.

In testimony whereof, we affix our signatures in presence of two witnesses.

EUGIE P. JOHNSON.
CHESTER I. LEE.

Witnesses:

E. H. SHARPLEY,
D. W. DAY.