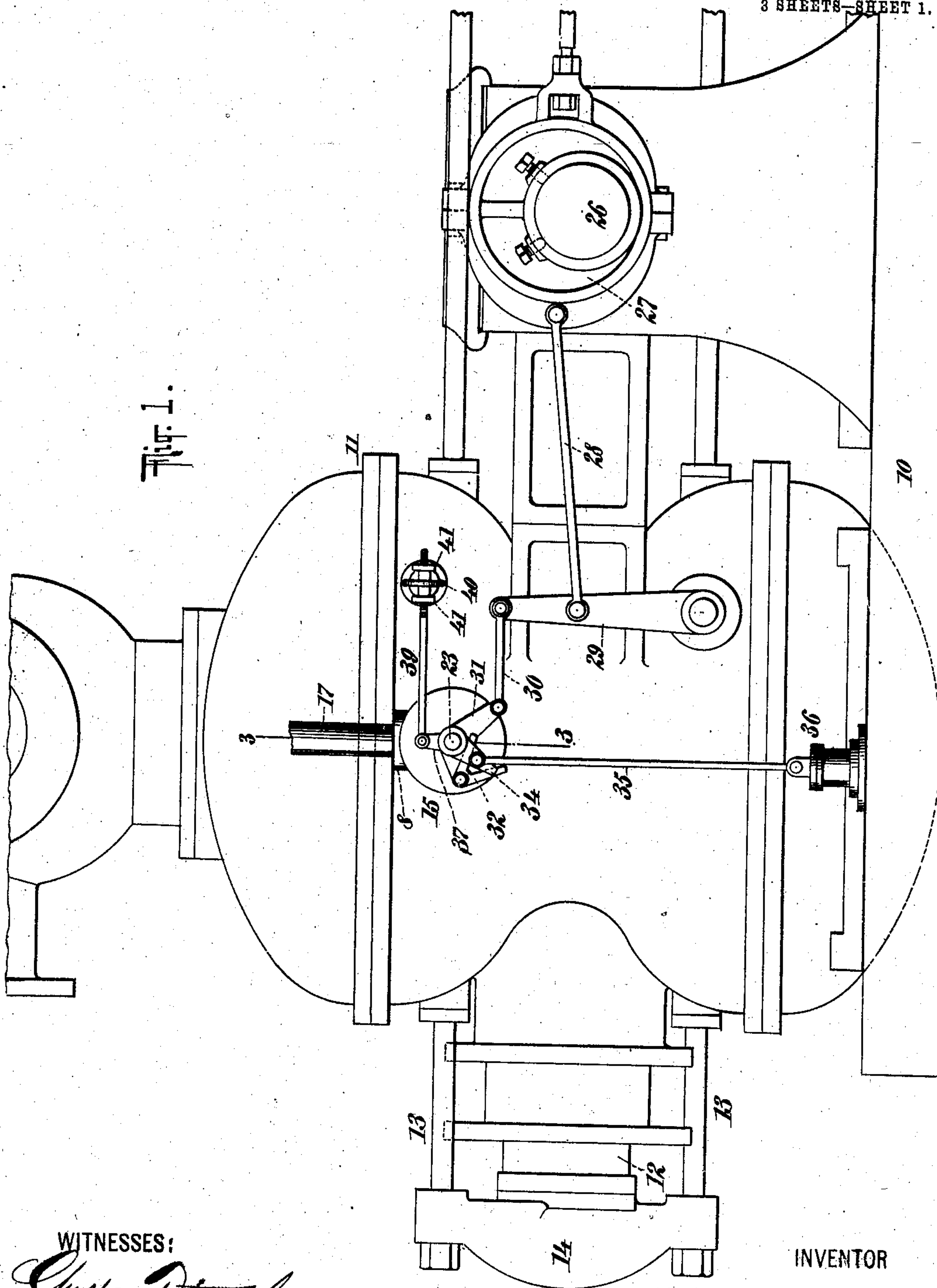


No. 827,149.

PATENTED JULY 31, 1906.

J. A. GROSHON.  
STEAM PUMPING ENGINE.  
APPLICATION FILED SEPT. 27, 1905.

3 SHEETS—SHEET 1.



WITNESSES:  
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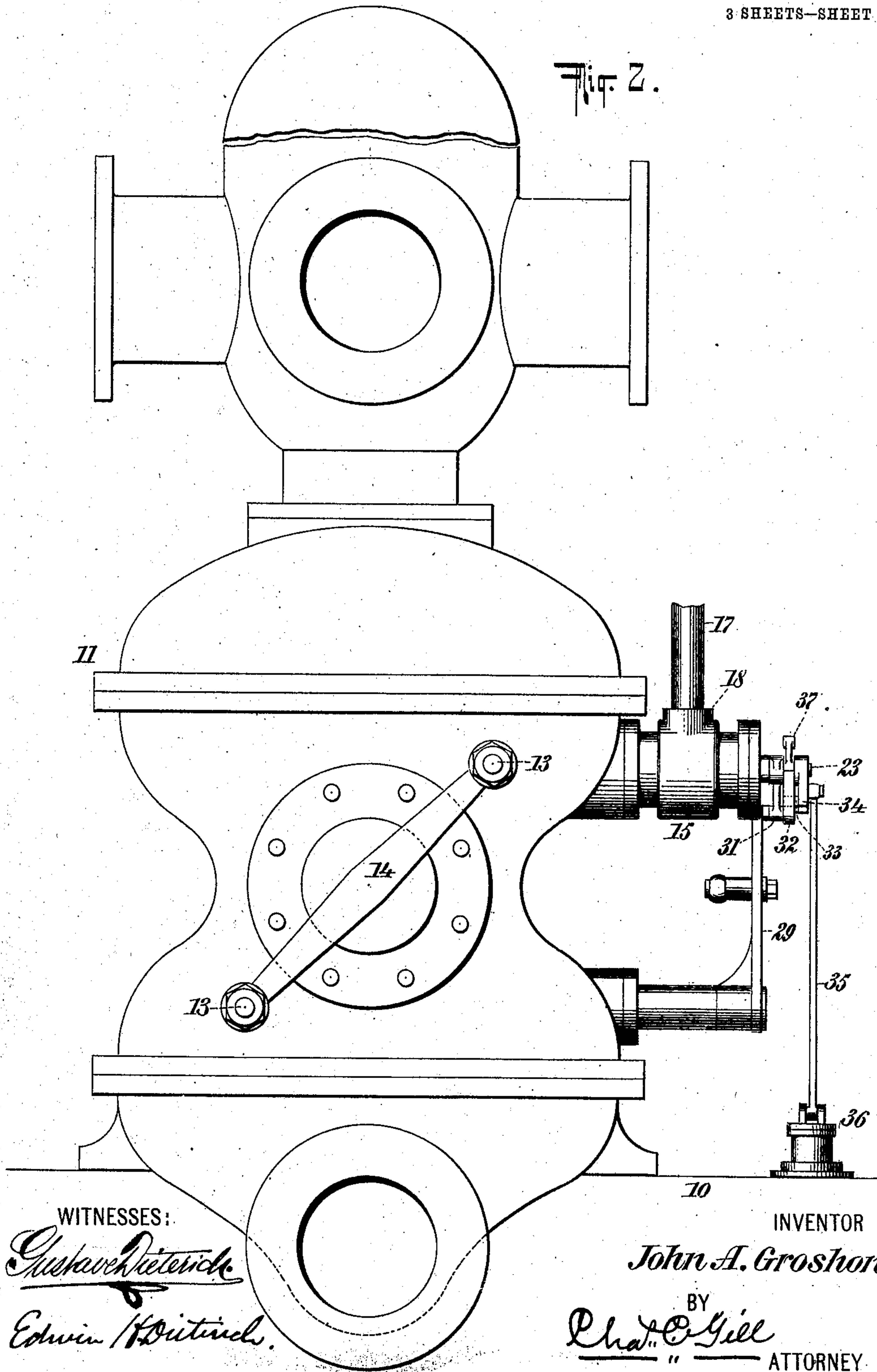
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3 SHEETS—SHEET 2.

Fig. 2.



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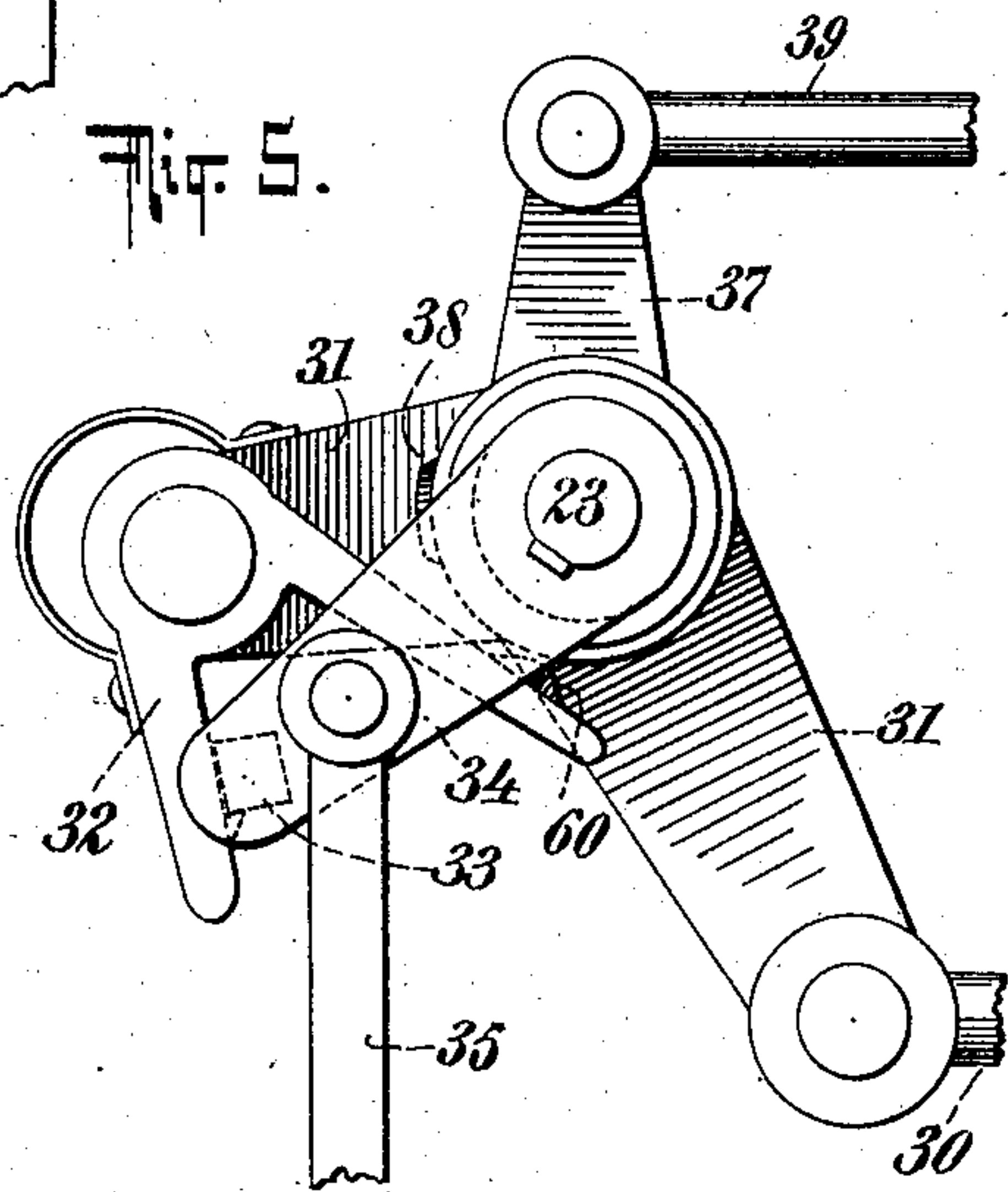
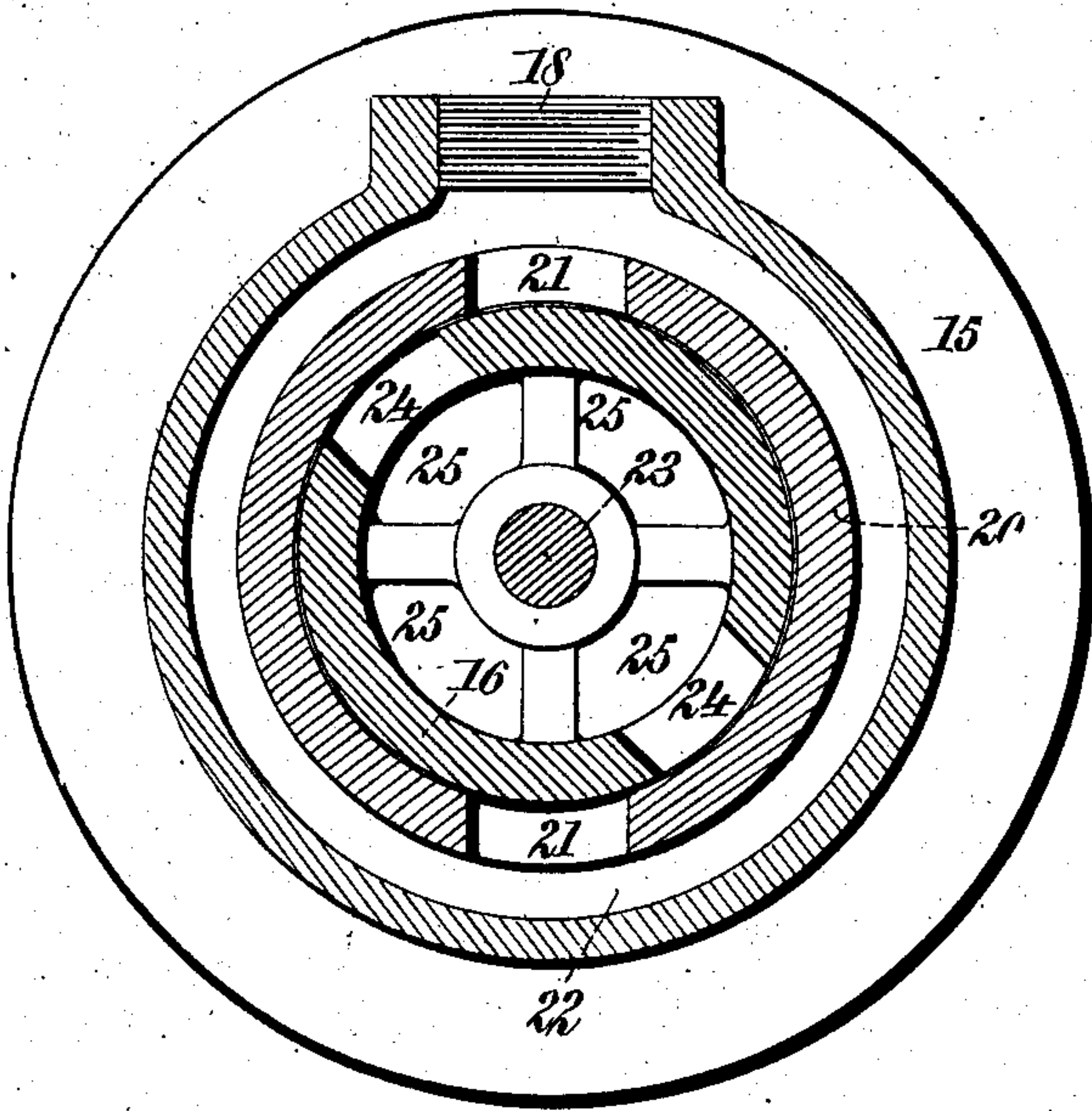
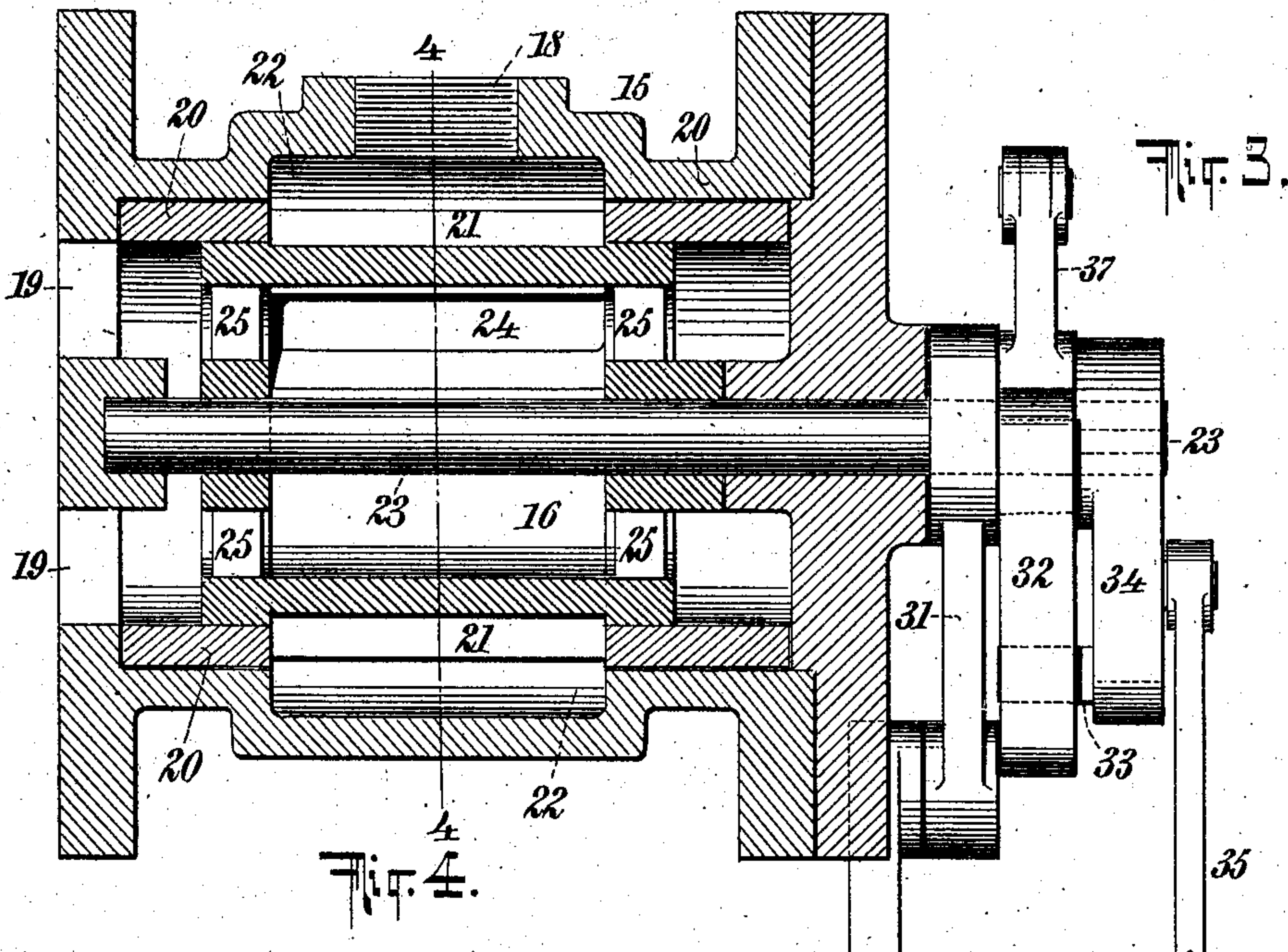


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# UNITED STATES PATENT OFFICE.

JOHN A. GROSHON, OF NEW YORK, N. Y.

## STEAM PUMPING-ENGINE.

No. 827,149.

Specification of Letters Patent.

Patented July 31, 1906.

Application filed September 27, 1905. Serial No. 280,275.

*To all whom it may concern:*

Be it known that I, JOHN A. GROSHON, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Steam Pumping-Engines, of which the following is a specification.

The invention relates to improvements in pumping-engines; and it consists in the novel features and combinations of parts hereinafter described, and particularly pointed out in the claims.

In the class of engines to which my invention more especially pertains and an example of which is illustrated in Letters Patent No. 711,702, granted October 21, 1902, to myself, the water is drawn into the pump-chamber by the vacuum or suction created by the pump-plunger on its backward movement and is discharged by the plunger during the forward stroke of the latter, suitable valves being provided at the inlet and discharge sides of said chamber for controlling the flow of the water. One great difficulty in the use of these steam pumping-engines, especially in gang or pipe well systems due to the necessary lift of water by suction, arises from the inability of the pump-plunger to create the necessary vacuum required for adequately filling the pump chamber or cylinder, in consequence of which the pump will not work quietly nor perform its full duty. In addition, air gathers in the cylinder and frequently the inlet-valves will not close until the plunger starts on its forward throw, when said valves will close with more or less of a slam, which is objectionable. It is obvious that unless during each backward stroke of the plunger the cylinder becomes filled with water there will be an inefficient and undesirable action of the pump, and this difficulty of securing the filling of the cylinder during each backward stroke of the plunger is one which has frequently been experienced, especially in instances in which an extreme lift is required to be effected by the suction created by the moving plunger.

The object of my invention is to produce means whereby without material change in the pump or materially adding to the cost of its manufacture the cylinder will become properly filled with water during the backward movement of the plunger and the inlet or suction valves will be caused to close natu-

rally and at the proper time, whereby the efficiency of the pump is enhanced and its operation attended by less noise.

In carrying out my invention I connect the cylinder directly with auxiliary vacuum-producing means and control the connection by a suitable valve timed by the engine to permit the vacuum to act in conjunction with the plunger during the backward stroke of the same, and I equip said valve with suitable gearing based on the Corliss principle for cutting off the vacuum at the proper time, so that the water drawn into the cylinder by the vacuum may not pass into the vacuum-producing means.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the pump end of a steam pumping-engine equipped with my invention. Fig. 2 is an end view of same. Fig. 3 is an enlarged vertical longitudinal section on the dotted line 3 3 of Fig. 1 of the valve intermediate the pump-cylinder and vacuum-producing means. Fig. 4 is a vertical section of same on the dotted line 4 4 of Fig. 3, and Fig. 5 is an enlarged elevation of the valve-gear.

In the drawings, 10 represents a suitable foundation for the steam pumping-engine, 11 the pump-casing, 12 the pump-plunger, 13 the plunger-rods, and 14 a cross-head connecting said rods, all of said parts being of usual form and construction and said pump-casing containing the usual water chamber or cylinder and inlet or suction and discharge valves. The steam pumping-engine will embody several pump-casings and a corresponding number of steam-cylinders, as usual and as shown in my aforesaid patent, No. 711,702; but the present invention may be fully understood by a consideration of one pump-casing without regard to the details of the steam-cylinders and their coacting parts, since I do not change the construction of the pump-casing or its parts, but add thereto the features constituting my invention.

Upon the side of the upper portion of the pump-casing 11 I secure a valve-casing 15, containing a rotary valve 16 and communicating with the pump-cylinder and also, through a pipe 17, with any suitable means for creating a vacuum, the valve 16 determining by its position when the vacuum thus created shall



act to draw the water into said cylinder. The casing 15 is cylindrical in cross-section. It has heads at its ends, as shown in Fig. 3, and it is provided with a nozzle 18 to receive  
 5 the pipe 17 and with ports 19, leading to the pump-cylinder. Within the casing 15 is a cylindrical valve member 20, having ports 21 and closely engaging the end portions of  
 10 said casing, while intermediate said end portions an annular chamber 22 is formed between said member 20 and the inner walls of said casing, said chamber being in constant communication with said ports. The valve  
 15 16 is secured upon a shaft 23, and it contains ports 24 in its cylindrical walls and ports 25 in its ends. The valve 16 closely fits within the valve member 20, and it is adapted to have its ports 24 moved into register with the  
 20 ports 21 of said member, and thus establish communication between the vacuum-creating means and the interior of the pump-cylinder. When the valve 16 is in the position shown in Fig. 4, it cuts off communication between the vacuum-creating means and the  
 25 pump-cylinder, and said valve will always be in such position during the forward stroke of the plunger 12.

The valve 16 is turned to its open position, that is to carry its ports 24 into register with  
 30 the ports 21 of the valve member 20, from the main shaft 26 and the eccentric 27 thereon through the connecting-rod 28, pivoted lever-arm 29, link 30, and bell-crank 31, which is freely mounted on the valve-shaft 23, and  
 35 has one of its arms pivotally connected with said link 30, while its other arm carries the pivoted forked latch 32, Fig. 5, adapted to engage a stud 33 on the inner side of the end of a crank-arm 34, which is keyed on said  
 40 shaft 23. When the bell-crank 31 is turned to the left, (looking at Figs. 1 and 5,) it will elevate the forked latch 32 and through the latter turn the crank-arm 34 upwardly, whereby the said arm, acting through the  
 45 shaft 23, is caused to turn the valve 16 to its open position. The crank-arm 34 is connected by a rod 35 with a dash-pot 36 of usual character. Upon the shaft 23 is freely mounted a crank-arm 37, carrying a cam 38  
 50 and connected with an adjusting-rod 39, which is threaded at its outer end and is engaged by an adjusting wheel or nut 40, confined between fixed parts 41. When the wheel or nut 40 is rotated, it will shift the rod  
 55 39, and thereby move the arm 37 for setting the cam 38 in just the desired position for it to be engaged at the proper time by the cam or stud 60 on the forked latch 32 during the upward movement of the latter for the purpose of compelling the release by the catch  
 60 32 of the stud 33 and permitting the closing of the valve 16, due to the downward movement of the crank-arm 34, whereby the vacuum-creating means is cut off from communication with the interior of the pump-

cylinder. The bell-crank 31, latch 32, crank-arm 34, releasing-cam 38, and dash-pot 36 form a valve-gear of the well-known Corliss principle, and the exact point of release may  
 70 be adjusted by means of the rod 39 and adjusting wheel or nut 40, it being the purpose to cut off the vacuum from the pump-cylinder after the same becomes filled and before the water is drawn by the vacuum into the connections leading to the vacuum-producing  
 75 means. The eccentric 27 thus opens the valve 16 as the pump-plunger finishes its forward stroke, so that the auxiliary vacuum may act to draw the water into the pump-cylinder during the backward stroke of said  
 80 plunger, and at the proper time said valve is released to close, said valve remaining closed during the forward stroke of the said plunger.

The vacuum pipe 17 may lead from any convenient vacuum-creating means, such as  
 85 a vacuum tank or pump, or from the condenser of the engine when a condensing-engine is made use of.

In carrying out my invention I do not materially vary the known construction of  
 90 steam pumping-engines, but add thereto the valve 16 and its operating-gear, connected with the eccentric on the main shaft, which, as usual, handles the engine-valves, and connect the chamber of said valve with means  
 95 for creating a vacuum sufficient to properly fill the pump-cylinder with water during the backward stroke of the plunger. The special construction of valve 16 presented is of importance on account of its efficiency and  
 100 certainty of operation and the fact that it is a balanced valve.

The steam pumping-engine equipped with my invention will be operated in the customary manner; but with my invention present  
 105 the action of the pump will be rendered more efficient and desirable. In the use of my invention the pump does not have to depend on the suction created by the plunger to lift the water and fill the pump-cylinder, which  
 110 suction is frequently inadequate, since on each backward stroke of the plunger the valve 16 permits the auxiliary vacuum to act directly through said cylinder and cause the latter to become completely filled with wa-  
 115 ter. An important effect of the auxiliary vacuum is that thereby all air is removed from the pump-cylinder during each backward stroke of the plunger. My invention therefore comprises means independent of  
 120 the pump-plunger for creating a vacuum within the pump-cylinder sufficient to completely fill the latter with water and automatic valve mechanism for controlling the action of the vacuum, such valve mechanism  
 125 acting in concert with the mechanism of the pump.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A steam pumping-engine having its 130



5 pump-cylinder connected with means for  
creating therein, independently of the suc-  
tion produced by the pump-plunger therefor,  
a vacuum adapted to insure the filling of said  
cylinder with water during the backward  
strokes of said plunger, mechanism for con-  
trolling the communication between said  
cylinder and the vacuum-producing means,  
and means operable from a moving part of  
10 the machine for actuating said mechanism  
in its control of said communication; sub-  
stantially as set forth.

2. A steam pumping-engine having its  
pump-cylinder connected with means for  
15 creating therein, independently of the suc-  
tion produced by the pump-plunger, a vacu-  
um adapted to insure the filling of said cylin-  
der with water during the backward strokes  
of said plunger, combined with valve mech-  
anism for controlling the communication be-  
tween said cylinder and the vacuum-produc-  
ing means, and connections between said  
valve mechanism and the operative parts of  
the engine; substantially as set forth.

25 3. In a steam pumping-engine, a connec-  
tion leading from the pump-cylinder to  
means for creating a vacuum for filling the  
cylinder with water during the back strokes  
of the pump-plunger, a valve in said connec-  
tion for controlling the same, and means op-  
30 erable from a moving part of the machine for

actuating said valve; substantially as set  
forth.

4. In a steam pumping-engine, a connec-  
tion leading from the pump-cylinder to 35  
means for creating a vacuum therein for fill-  
ing the cylinder with water during the back  
strokes of the pump-plunger, a valve in said  
connection for controlling the same, means  
operable from a moving part of the machine 40  
for opening said valve, and means for effect-  
ing the closing of said valve; substantially as  
set forth.

5. In a steam pumping-engine, a connec-  
tion leading from the pump-cylinder to 45  
means for creating a vacuum therein for fill-  
ing the cylinder with water during the back  
strokes of the pump-plunger, a valve in said  
connection for controlling the same, means  
operable from a moving part of the machine 50  
for opening said valve, means for closing  
said valve, and means for adjusting the  
point at which said valve may be released to  
close; substantially as set forth.

Signed at New York city, in the county of 55  
New York and State of New York, this 25th  
day of September, A. D. 1905.

JOHN A. GROSHON.

Witnesses:

CHAS. C. GILL,  
IRENE CRAWFORD.