

No. 611,792.

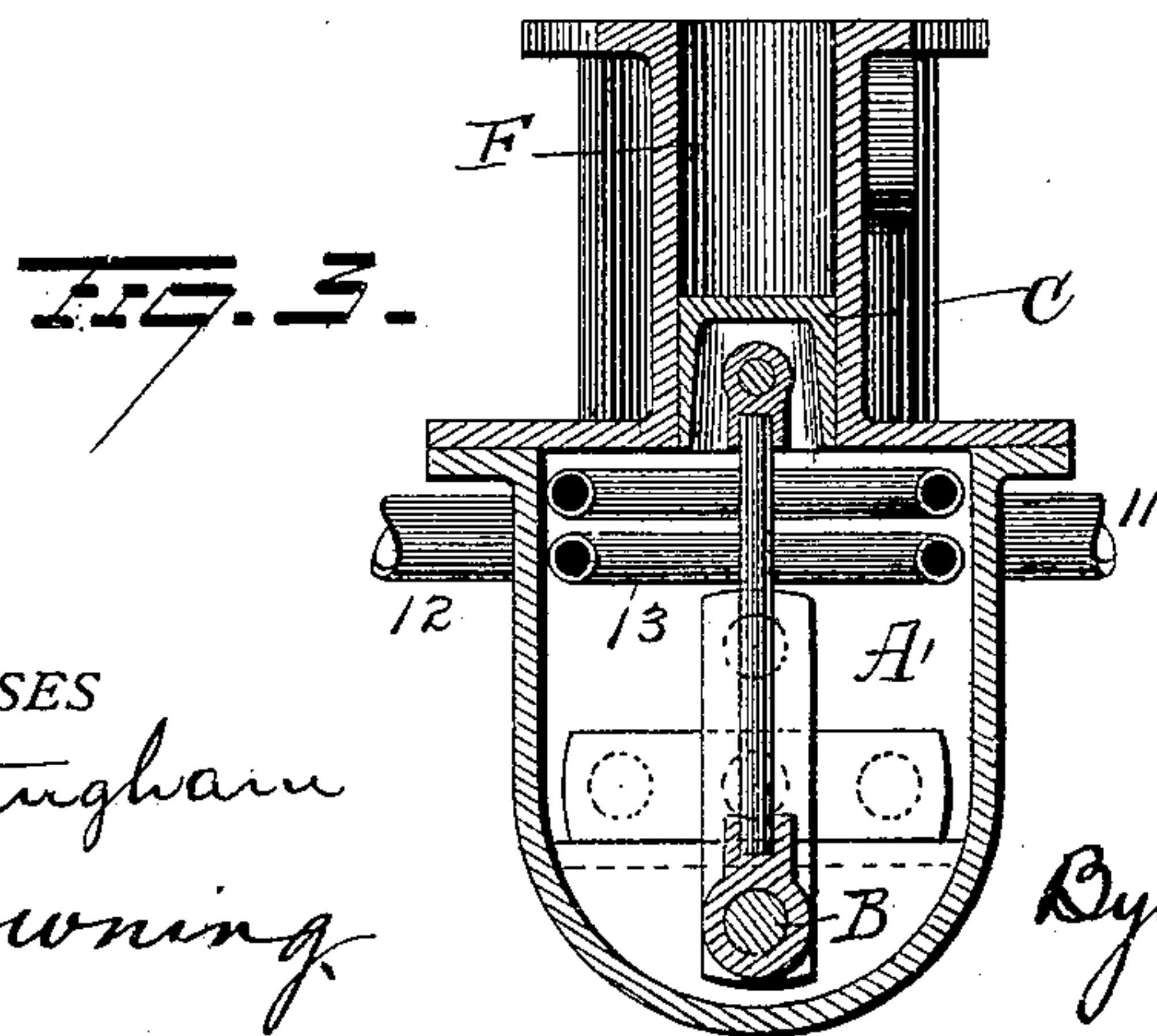
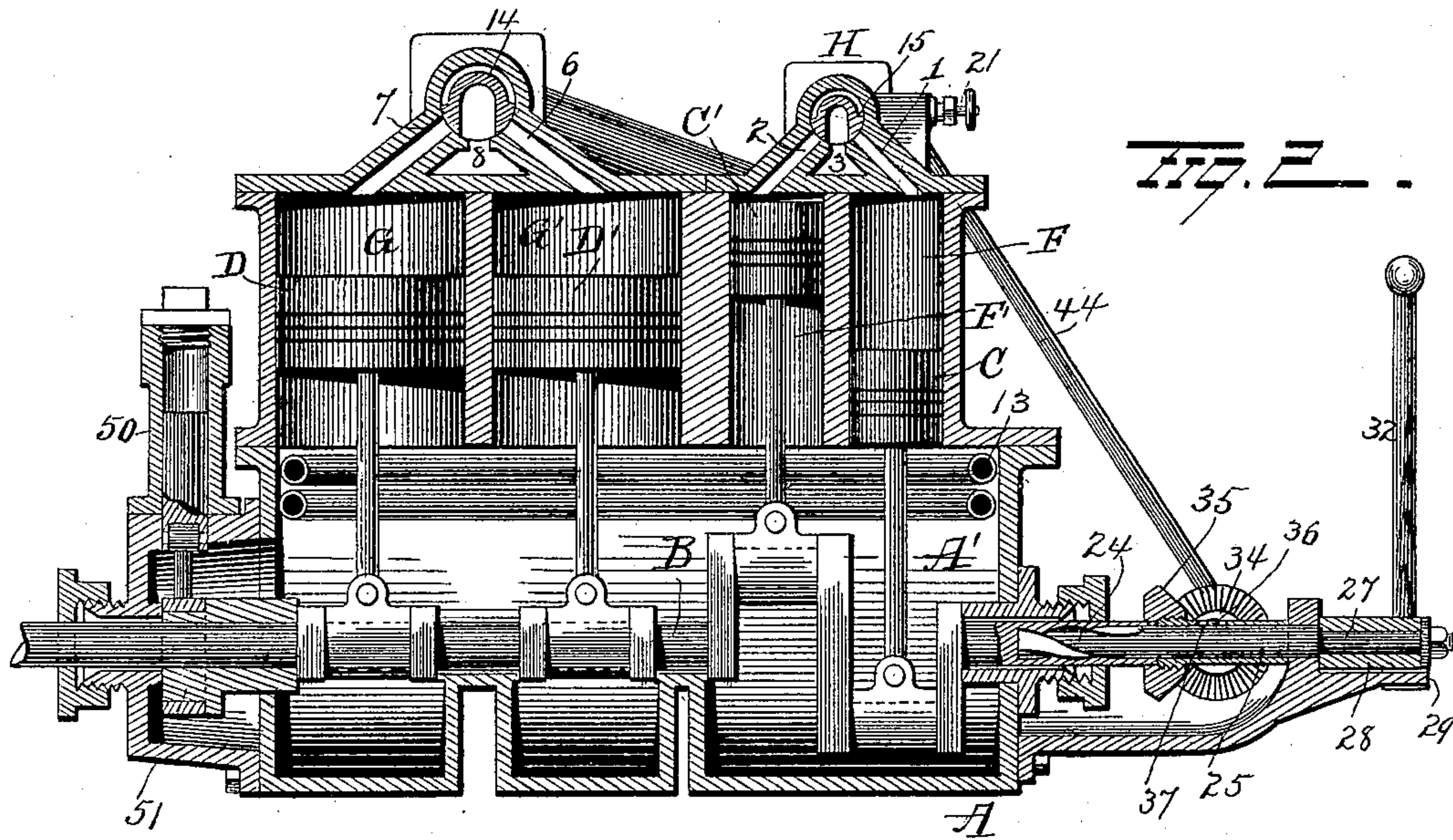
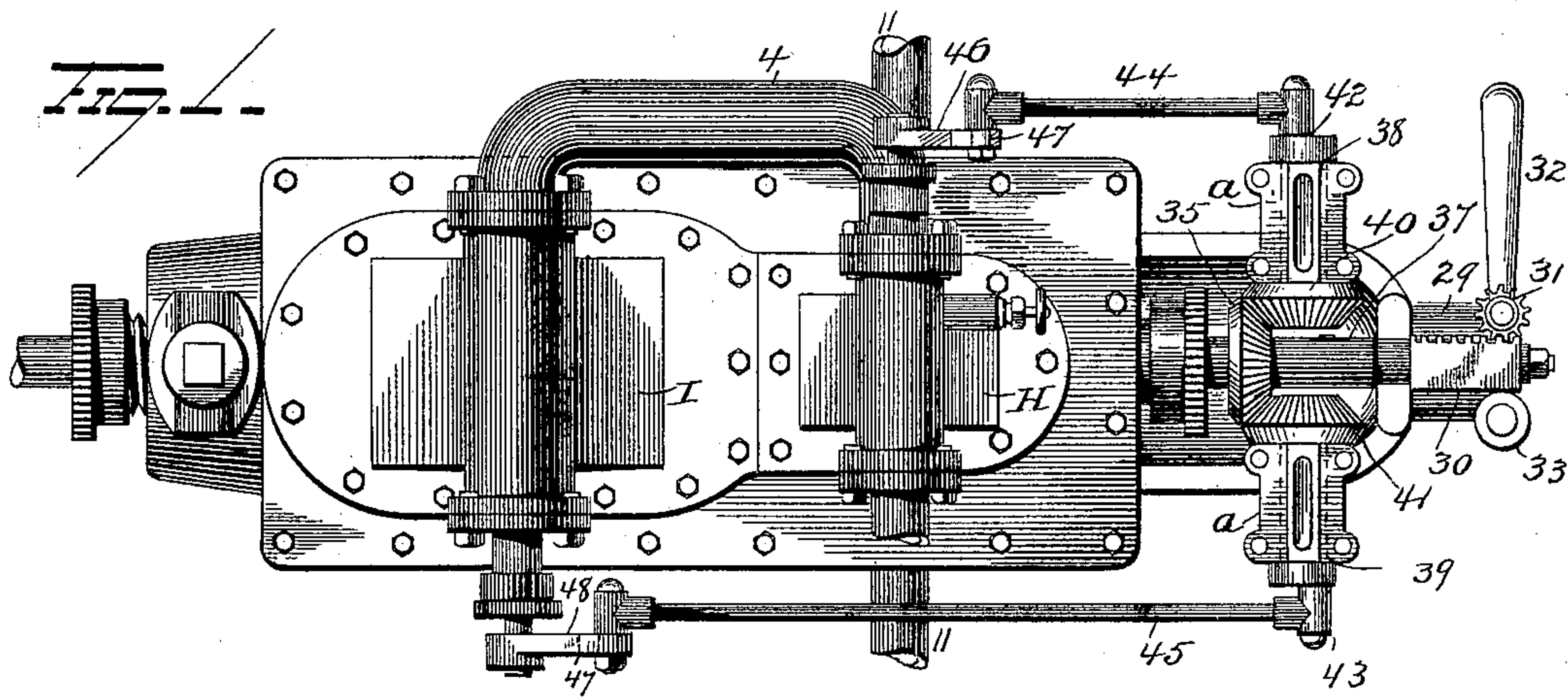
Patented Oct. 4, 1898.

F. W. OFELDT.
ENGINE.

(Application filed Jan. 8, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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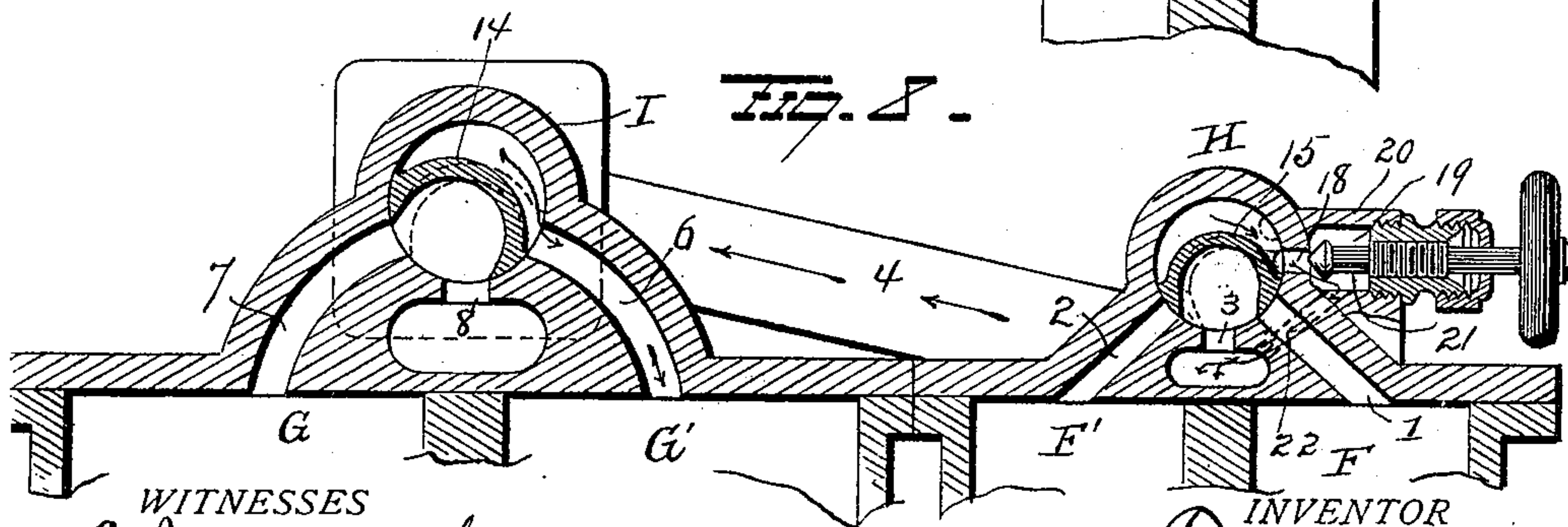
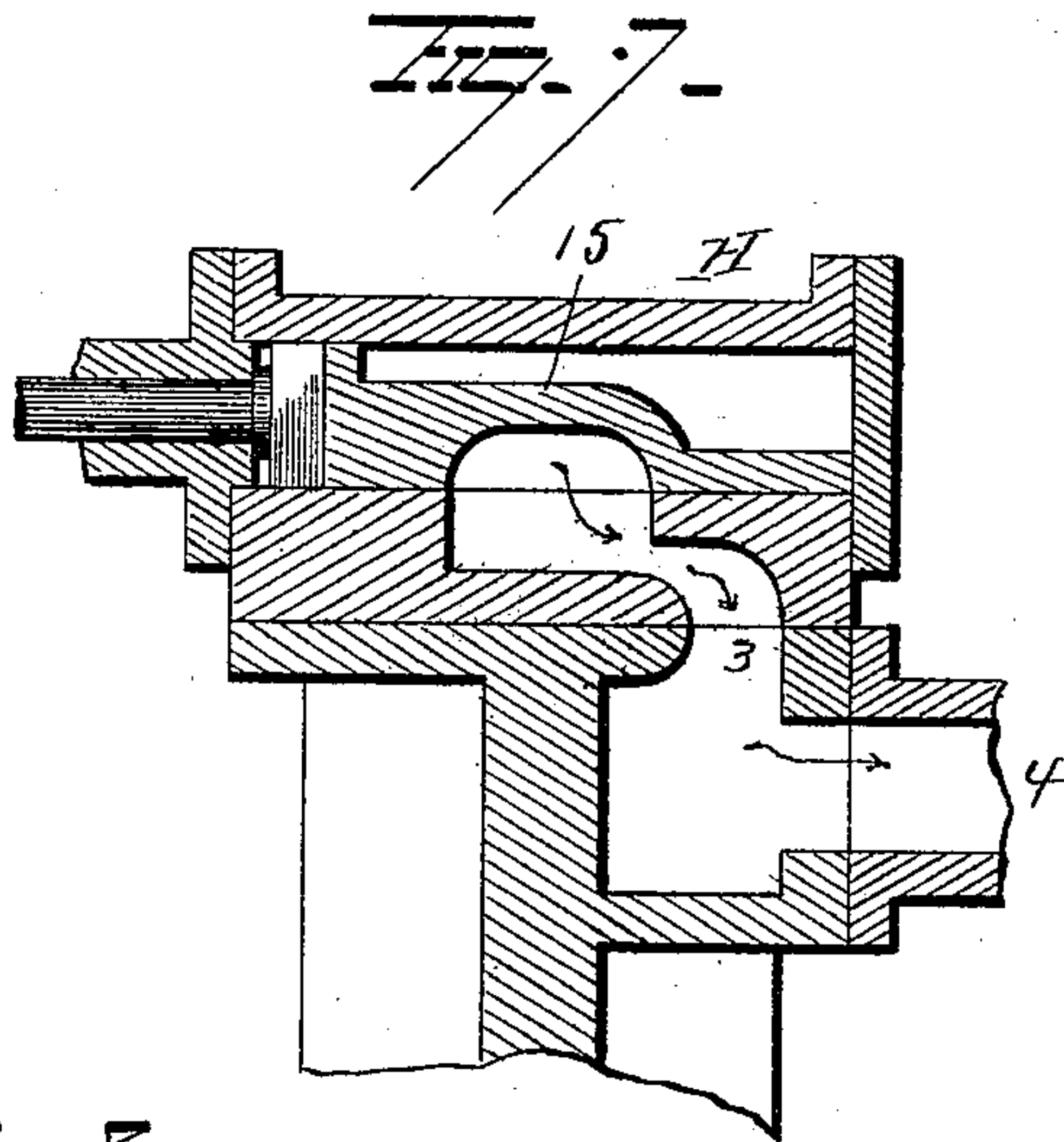
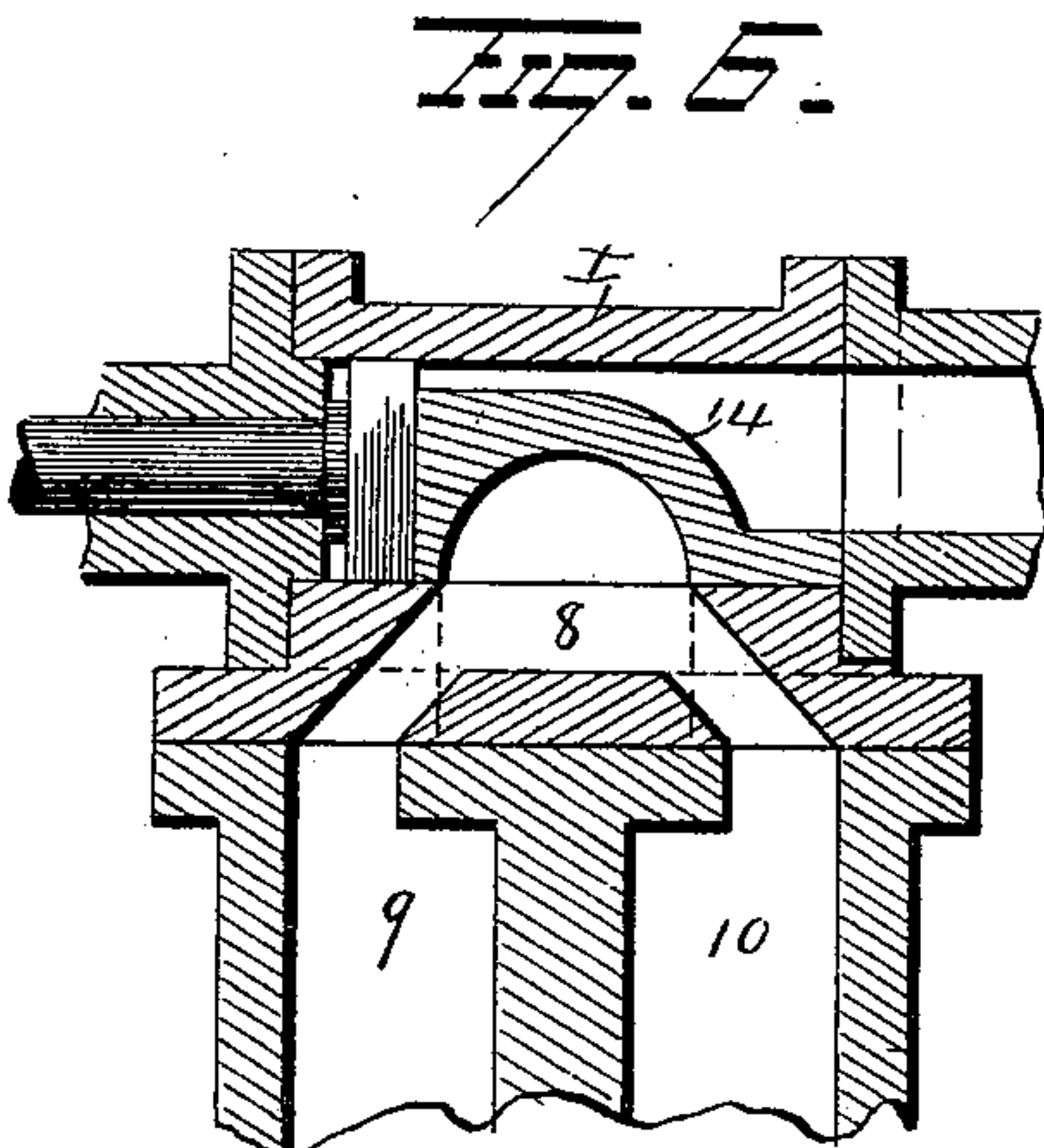
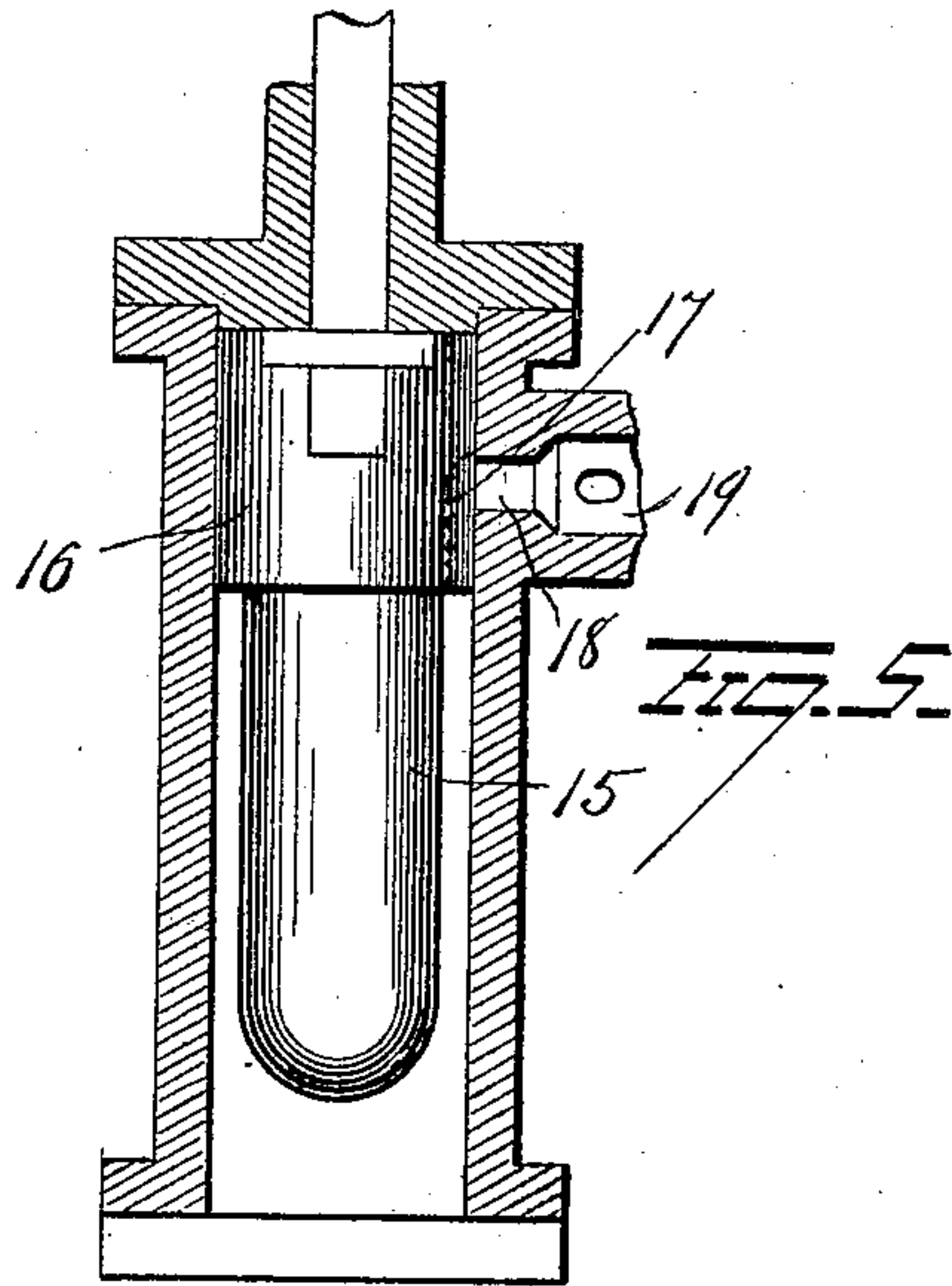
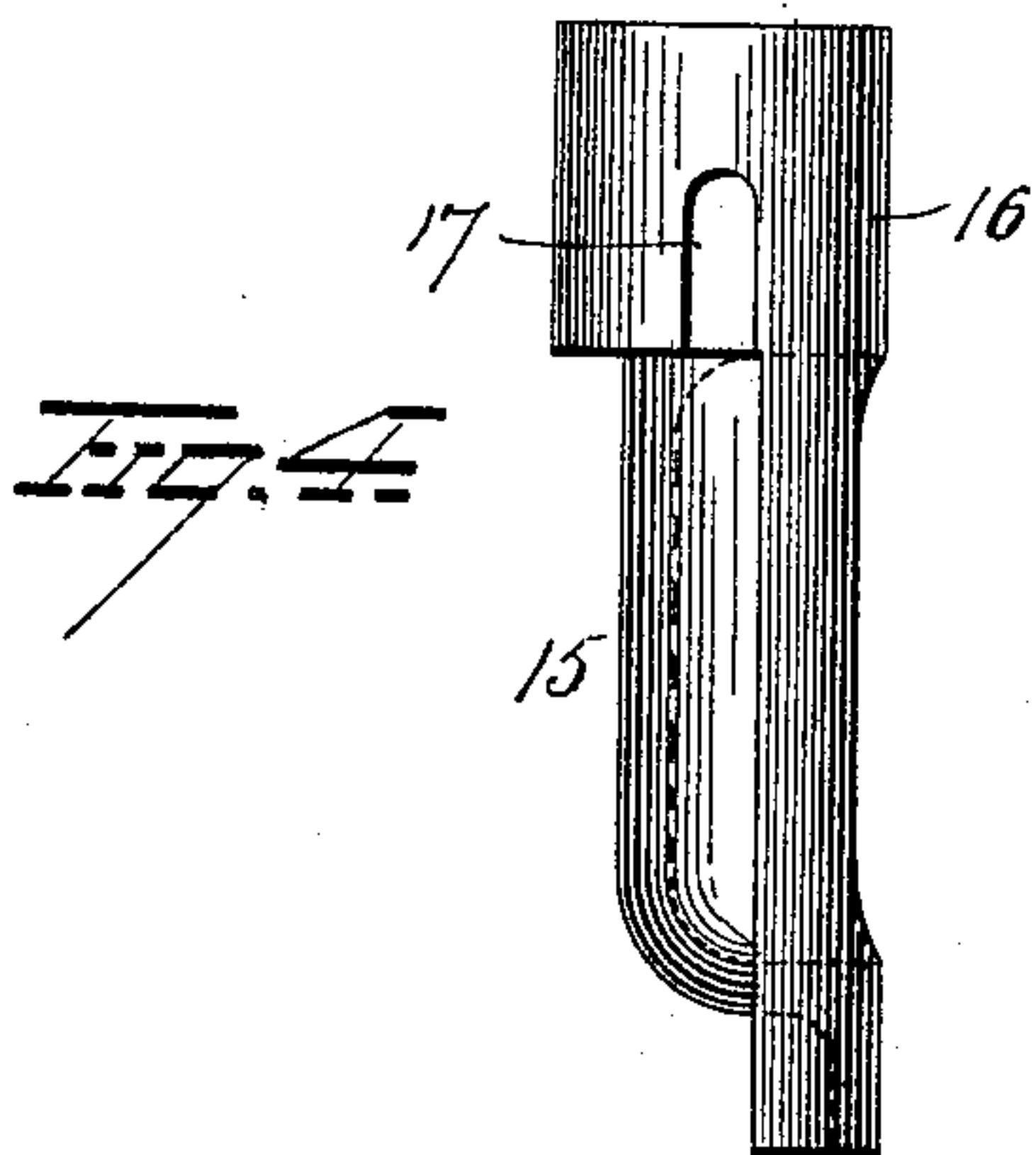
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

FRANK W. OFELDT, OF NEW YORK, N. Y.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 611,792, dated October 4, 1898.

Application filed January 8, 1898. Serial No. 666,091. (No model.)

To all whom it may concern:

Be it known that I, FRANK W. OFELDT, of New York, (Brooklyn,) in the county of Kings and State of New York, have invented certain
5 new and useful Improvements in Engines; 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
10 use the same.

My invention relates to an improvement in compound single-acting engines, and more particularly to such as are adapted to be operated by means of vapor, one object of the
15 invention being to increase the efficiency and easy running of a vapor-engine without adding proportionately to the expense of construction.

A further object is to produce a vapor-engine which shall be simple and compact in construction, comprise comparatively few parts, and which can be easily controlled and made to effectually perform all its functions.

A further object is to provide simple and
25 efficient means whereby to prevent back pressure on the high-pressure piston.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of
30 parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of an engine embodying my improvements. Fig. 2 is a longitudinal sectional
35 view of the same. Fig. 3 is a cross-section of the engine. Figs. 4, 5, 6, 7, and 8 are detail views illustrating the valves.

A represents the base of the engine, constructed to form a crank-pit A' and to support
40 bearings for a crank-shaft B, the latter having four cranks, to which the rods of a corresponding number of pistons C C' and D D' are connected. The pistons C C' are adapted to operate in high-pressure cylinders F F', and the
45 pistons D D' operate in larger low-pressure cylinders G G'.

A valve-chest H is located over the high-pressure cylinders F F' and is common to them both, having inlet-ports 1 2 for the
50 respective cylinders and having a common exhaust-port 3, adapted to communicate with a pipe or duct 4, by means of which the exhaust

from the high-pressure cylinders is conducted to the valve-chest I of the low-pressure cylinders G G'. The valve-chest I is made with
55 inlet-ports 6 7 for the low-pressure cylinders and with an exhaust-port 8, which communicates with two pipes 9 10, (see Fig. 5,) by means of which the exhaust from the low-pressure cylinders is conducted to the crank-
60 pit A', from which latter it will be conveyed by means of pipes 11 12. The pipes 11 12 are made to communicate with the crank-pit at points in proximity to the top thereof, so that lubricating-oil contained in the crank-pit will
65 not escape with the exhausted vapors. A pipe 13 is also located in the upper part of the crank-pit immediately under the cylinders, and through this pipe the alcohol or other fluid to be vaporized and used to operate
70 the engine is passed. The exhausted vapors entering the crank-pit, as above described, are utilized to heat the pipe 13, and these vapors, coming into contact with said pipe, will be condensed by the lower temperature of the same, and when thus condensed
75 will drop and assist in the lubrication of the engine.

An oscillatory valve 14 is mounted in the valve-chest I of the low-pressure cylinders
80 and adapted to alternately open and close the inlet-ports of the respective cylinders G G' and connect said cylinders with the exhaust-port. The oscillatory valve 15 in the valve-chest H of the high-pressure cylinders is constructed in a manner similar to the valve 14,
85 except that it is made in its enlarged end 16 with a groove or duct 17, adapted to communicate, under certain conditions, with a port 18, leading to a chamber 19, made in an enlargement 20 on the valve-chest H. A manually-operated valve 21 is mounted in the enlargement 20 and adapted to be made to close
90 the port 18. A port or duct 22 communicates at one end with the chamber 19 and at the other end with the exhaust-port of the high-pressure cylinders. Thus it will be seen that when the valve 21 is open and the valve 15
95 is in the position shown in Fig. 8 the live vapors will pass through the groove or duct 17, port 18, chamber 19, and port or duct 22 to the exhaust-port of the high-pressure cylinders and then pass over to the valve-chest I, through the pipe or duct 4, and then through
100

one of the inlet-ports to one of the low-pressure cylinders. By means of the construction above described (the valve 21 being open) means are provided for closing the passage
 5 of live vapor to the low-pressure cylinder when the low-pressure crank is crossing the top center, and thus back pressure on the high-pressure piston is avoided. The high-pressure valve only allows live vapor to enter
 10 the low-pressure valve-chamber when the low-pressure cranks are at half-stroke and shuts the opening to the pass-over valve-chamber 19 when the low-pressure cranks are near the center.

15 One end of the crank-shaft B is extended beyond its bearing and provided internally with a worm-screw, with which the worm 24 on a shaft 25 is adapted to mesh. The shaft 25 has a bearing on a bracket 26, (preferably
 20 trough-shaped,) secured to one end of the base or casing A. The shaft 25 is provided at its outer end with a spindle 27, having its bearing in a block 28, mounted to slide longitudinally on an arm 29 of the bracket 26. A
 25 rack-bar 30 is secured to the sliding block 28 and is adapted to be actuated by a pinion 31, to which an operating handle or lever 32 is secured. The sliding block is guided between said pinion and a roller 33, mounted
 30 on the arm 29 of the bracket 26. A sleeve 34 is mounted on the shaft 25 and provided at one end with a bevel-pinion 35. The shaft 25 is provided with a lug 36, adapted to enter a slot or groove 37 in the sleeve 34, whereby
 35 to cause said sleeve and shaft to rotate together and at the same time permit a longitudinal movement of the shaft relatively to the sleeve. Shafts 38 39 are mounted in suitable bearings *a a* on the bracket 26 and provided
 40 at their inner ends with bevel-pinions 40 41, respectively, and adapted to receive motion from the pinion 35. The respective shafts 38 39 are provided at their outer ends with crank-arms 42 43, and to these crank-
 45 shafts pitmen 44 45 are connected. The stem of the high-pressure valve is provided with an arm or lever 46, having a slot 47 at its free end, with which the pitman 44 is connected. The stem of the low-pressure valve
 50 is provided with a similar arm or lever 48, with which the pitman 45 is connected, the free end of said lever 48 being slotted the same as lever 46.

From the above construction it will be seen
 55 that motion will be transmitted from the crank-shaft B through the gearing to the valves to properly operate them. When it is desired to reverse the engine, the operating-lever 32 will be moved to actuate the sliding
 60 block 28 and move the shaft 25 longitudinally. When the shaft 25 is thus moved longitudinally, it will by its worm connection with the crank-shaft B be made to rotate and turn the sleeve 34 and with it the pinion 35, secured thereto, and thus cause motion to be
 65 imparted to the valves to reverse their relation to the valve-ports.

My improvements are simple in construction and are effectual in all respects in the performance of their functions. 70

Slight changes might be made in the details of construction of my invention without departing from the spirit thereof or limiting its scope, and hence I do not wish to limit myself to the precise details herein set forth. 75

If desired, an alcohol or other pump 50 may be operated by means of the crank-shaft B, the latter being provided with an eccentric 51, connected with the piston of said pump.

I do not in this case claim the means herein shown and described for lubricating, feed-heating, and condensing exhaust, the same being the subject-matter of a divisional application filed July 19, 1898, Serial No. 686,363. 80

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is— 85

1. In a compound single-acting engine, the combination with two high-pressure cylinders and two low-pressure cylinders, pistons in
 90 said cylinders and a crank-shaft having cranks corresponding in number with said pistons to which said pistons are independently connected, of a valve common to both high-pressure cylinders, another valve com- 95
 mon to both low-pressure cylinders, a connection between the exhaust-port of the high-pressure cylinders and the inlet of the low-pressure cylinders and intermediate operating devices between said valves and the crank- 100
 shaft, substantially as set forth.

2. In a compound single-acting engine, the combination with two high-pressure cylinders arranged side by side, two low-pressure cylinders arranged side by side, pistons in said
 105 cylinders, and a crank-shaft with which said pistons are connected, of a valve common to both of said high-pressure cylinders, another valve common to both of said low-pressure cylinders, a connection between the exhaust 110
 of the high-pressure cylinders and the inlet of the low-pressure cylinders and means for operating said valves, substantially as set forth.

3. In a compound, single-acting engine, the combination with a high-pressure cylinder and a low-pressure cylinder and pistons in
 115 said cylinders, of a valve for each cylinder, a connection between the exhaust of the high-pressure cylinder and the inlet of the low-pressure cylinder and a by-pass between the valve-chamber of the high-pressure cylinder and the exhaust-port of the high-pressure cylinder, said by-pass being under the control of the valve of the high-pressure cylinder, substantially as set forth. 125

4. In a compound single-acting engine, the combination with a high-pressure cylinder, a valve-chamber communicating therewith, a low-pressure cylinder and a valve-chamber
 130 communicating therewith, of a passage between the exhaust-port of the high-pressure cylinder and the valve-chamber of the low-pressure cylinder, a passage connecting the

valve-chamber of the high-pressure cylinder with the exhaust of the high-pressure cylinder, a valve in the high-pressure valve-chamber constructed and adapted to open and close said last-mentioned passage and also the ports communicating with said high-pressure cylinder, a valve in the valve-chamber of the low-pressure cylinder adapted to control the ports to the latter and pistons in said cylinders, substantially as set forth.

5. In a compound single-acting engine, the combination with a high-pressure cylinder, a low-pressure cylinder, valve-chests communicating with said cylinders, one for each cylinder, an enlargement on the valve-chest of the high-pressure cylinder and having a chamber therein, a port connecting said chamber with the chamber in said valve-chest, a valve

for closing said port, a port connecting said chamber with the exhaust-port of the high-pressure cylinder, a valve in the valve-chest of the high-pressure cylinder and having a groove to communicate with the port leading to said chamber, a passage connecting the exhaust of the high-pressure cylinder with the valve-chest of the low-pressure cylinder, a valve in said low-pressure cylinder and pistons in said cylinders, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANK W. OFELDT.

Witnesses:

DAVID B. HUTTON,
JOSEPH P. WHITE.