F. C. OLNEY.

ROTARY ENGINE.

APPLICATION FILED JUNE 18, 1910.

996,668.

Patented July 4, 1911.

2 SHEETS—SHEET 1.

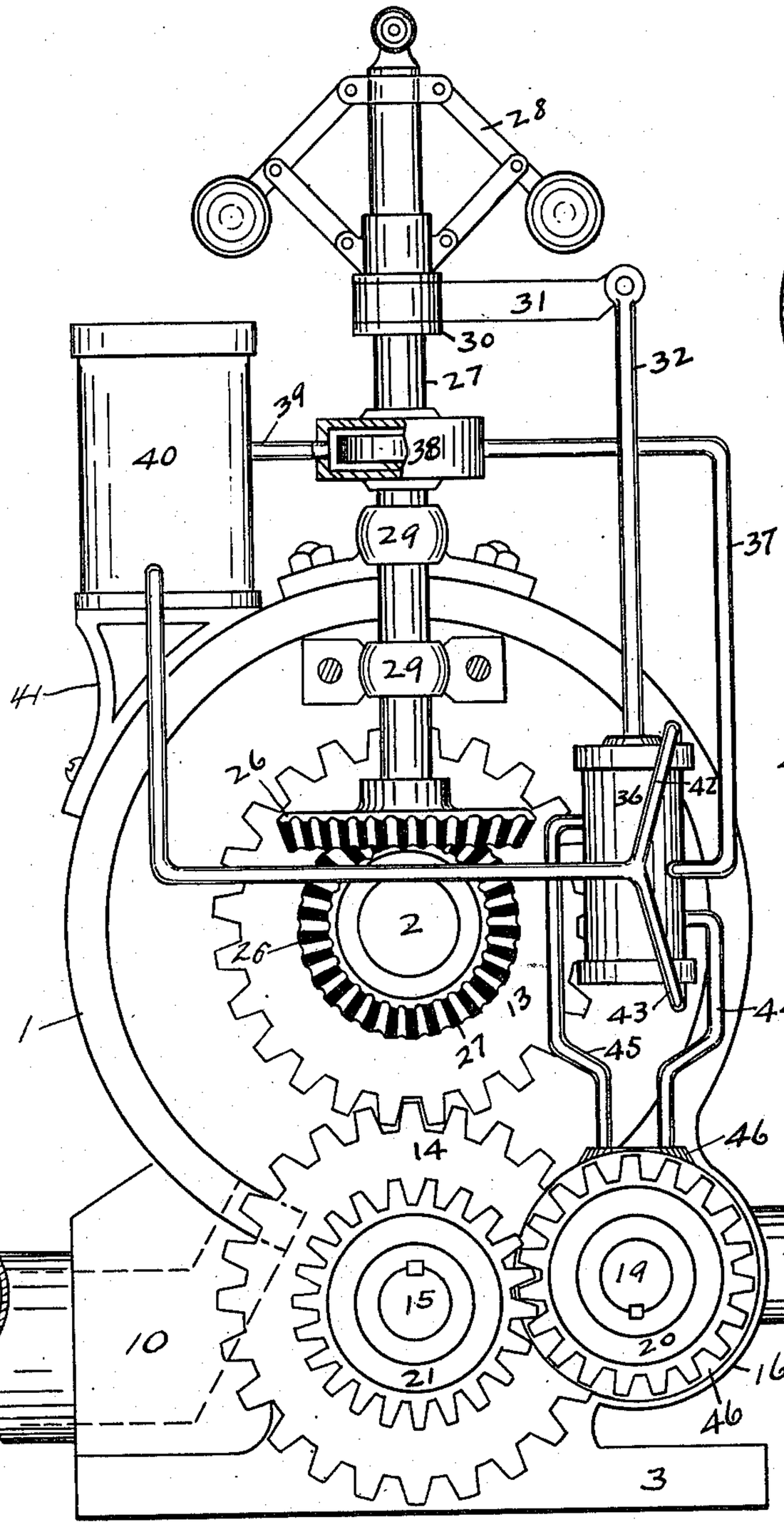

Fig. 1.

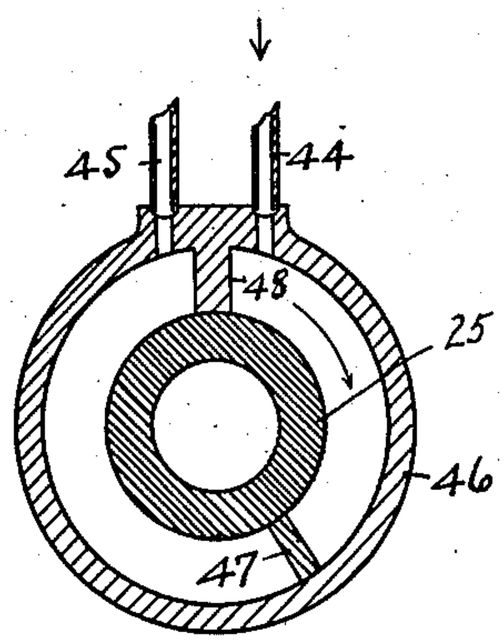

Fig. 2.

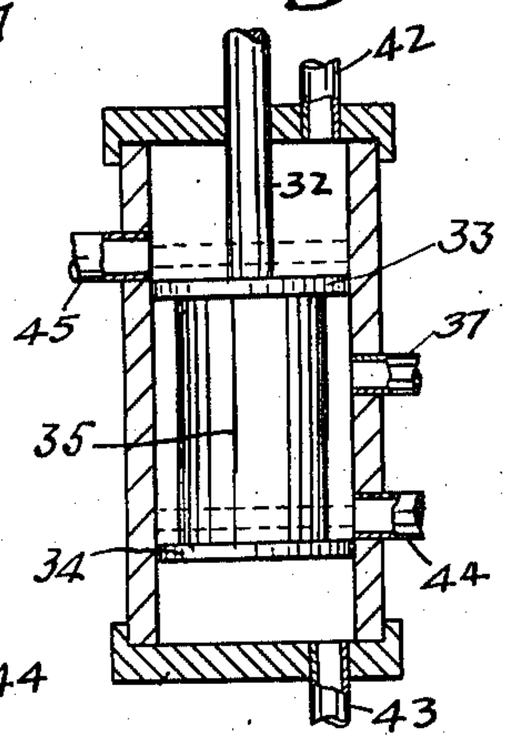

Fig. 3.

WITNESSES.

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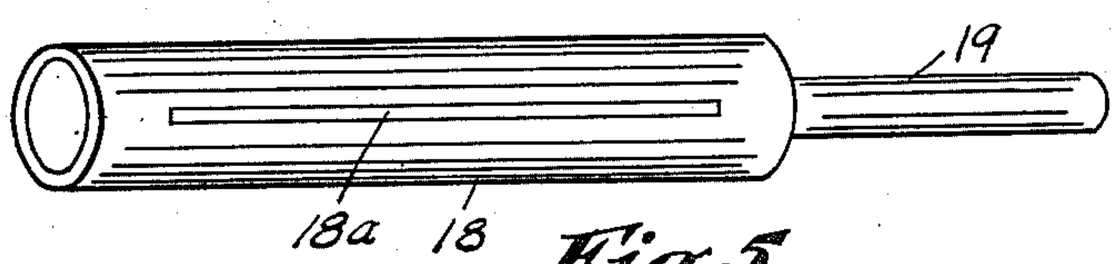

Fig. 5.

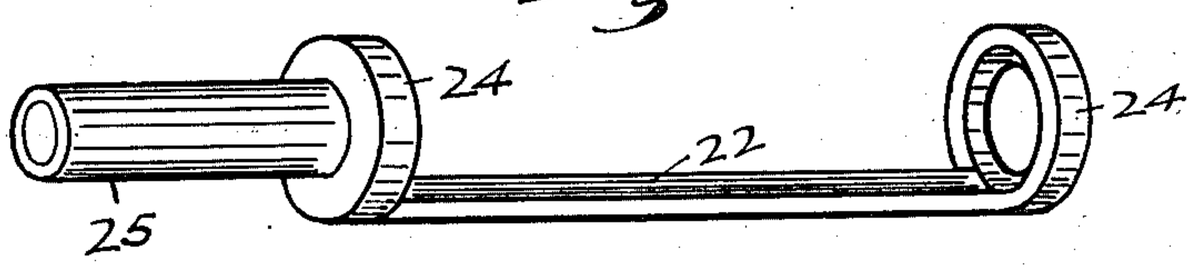

Fig. 6.

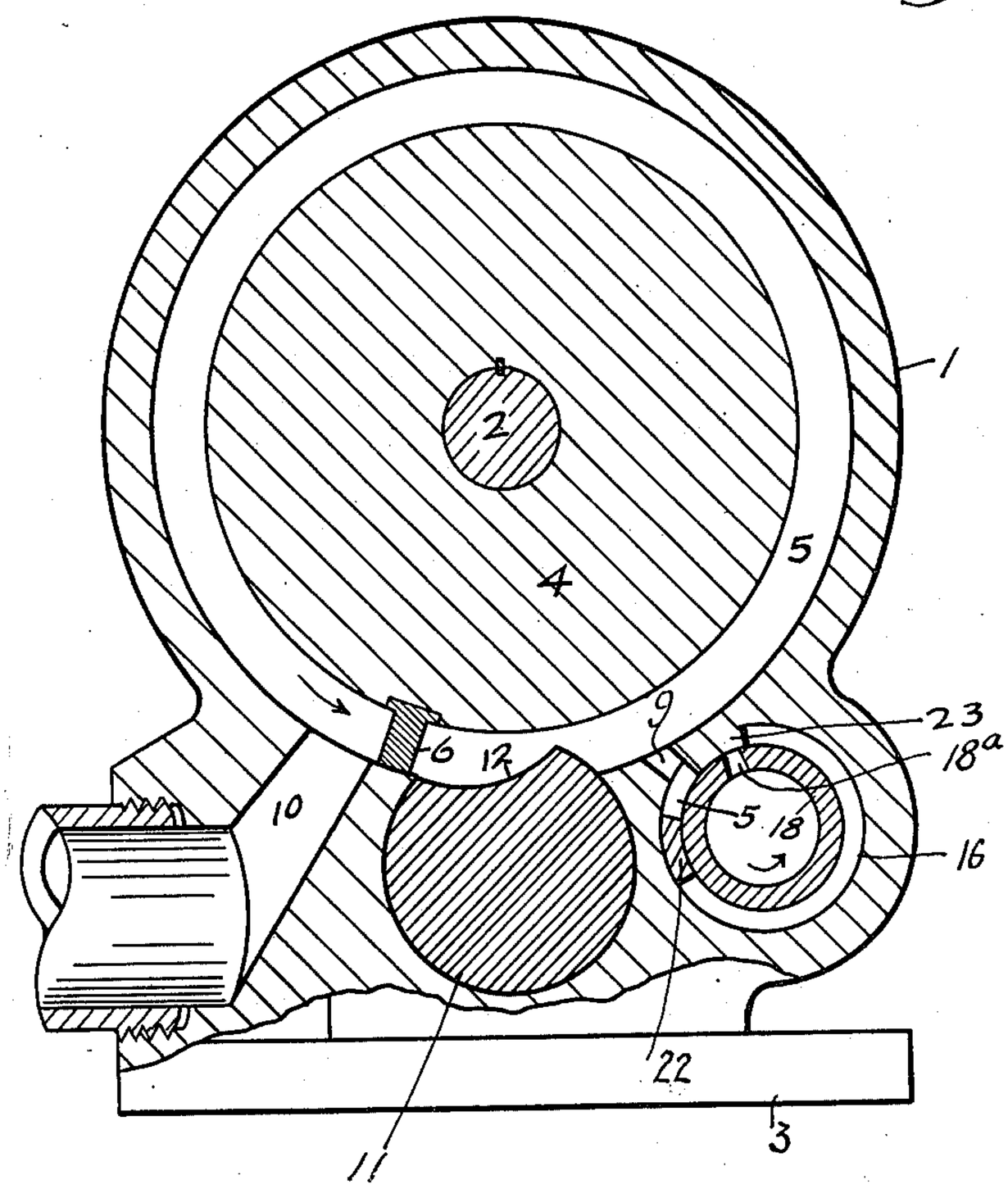

Fig. 4.

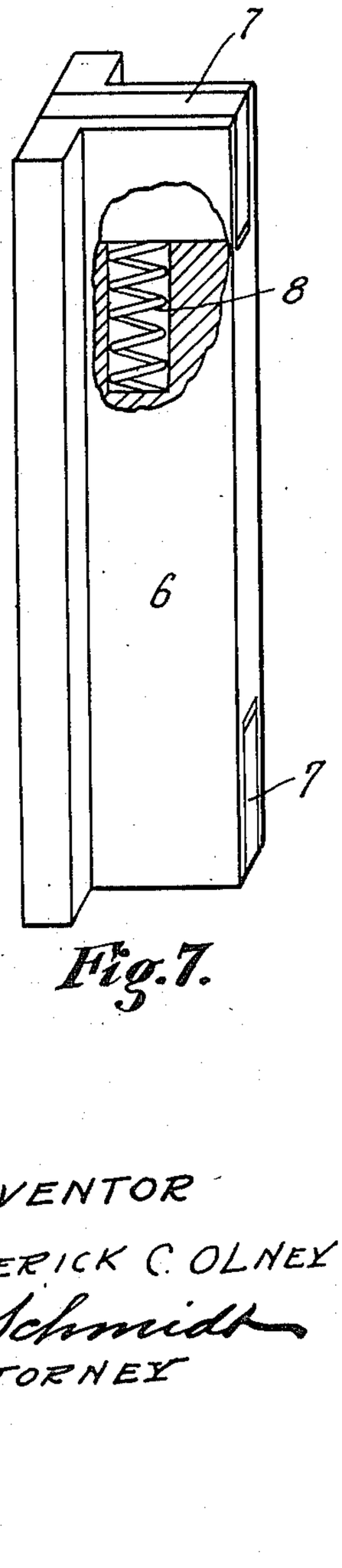

Fig. 7.

WITNESSES

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UNITED STATES PATENT OFFICE.

FREDERICK C. OLNEY, OF SPOKANE, WASHINGTON, ASSIGNOR OF FORTY-FIVE ONE-HUNDREDTHS TO HENRY L. DOBLE, OF SPOKANE, WASHINGTON.

ROTARY ENGINE.

996,668. Specification of Letters Patent. Patented July 4, 1911.

Application filed June 18, 1910. Serial No. 567,556.

To all whom it may concern:

Be it known that I, FREDERICK C. OLNEY, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to improvements in rotary engines of that class characterized by a cylinder, a rotary piston working therein, and an abutment between the inlet and exhaust ports of the cylinder, said abutment being movable to permit the piston to pass.

The object of the invention is to provide an improved speed controlling mechanism, a cut off valve being provided, and an actuating connection between the same and a speed governor deriving its motion from the engine, said connection including a fluid pressure apparatus also driven by the engine.

In order that the invention may be fully understood, reference is had to the accompanying drawings forming a part of this specification, in which drawing—

Figure 1 is an elevation of the engine; Fig. 2 is a cross section, and Fig. 3 a vertical section of portions of the speed controlling apparatus; Fig. 4 is a vertical section of the engine cylinder taken transversely of the shaft; Fig. 5 is a perspective view of the admission valve; Fig. 6 is a perspective view of the cut off valve; Fig. 7 is a perspective view of the piston wing.

In the drawings, 1 denotes the cylinder of the engine through the center of which a shaft 2 extends. The cylinder has a base 3 which may be formed integral therewith. On the inside of the cylinder is concentrically mounted a rotor comprising a disk 4 keyed or otherwise made fast on the shaft 2. The diameter of the rotor is less than the internal diameter of the cylinder so that an annular steam space 5 is had in the cylinder. Across this space extends a piston wing or blade 6 which is carried by the rotor, and from which it extends radially. The piston wing is rigidly fastened to the rotor and carries packing strips 7 at its ends which strips are in contact with the end walls or heads of the cylinder whereby a steam-tight joint is had. The packing strips are forced outwardly against the cylinder end walls by springs 8. There is no packing between the outer end of the wing and the cylinder wall, this being a ground fit. If desired, two or more piston wings may be employed. Inasmuch as the rotor is fast on the shaft, and the wing is fast on the rotor, it will be evident that these parts will rotate together when steam or other fluid pressure is admitted into the space 5. The engine will also operate as a compressor or pump upon applying power to the shaft 2.

In the base portion of the cylinder are ports 9 and 10, the former being the inlet and the latter the exhaust. Between these ports is located an abutment 11 which divides the steam space 5 into two parts. This abutment is movable to permit the piston wing 6 to pass. The abutment is a solid drum having formed in one side a segmental recess 12. The drum is mounted in a chamber made in the base portion of the cylinder and its diameter is such that its periphery can come in contact with the periphery of the rotor. The length of the drum is also such that it extends entirely across the steam space. It will therefore be evident that a partition is formed in the steam space between the inlet and exhaust ports except during the time the recessed portion is passing therethrough at which time the piston wing passes.

The abutment is rotated from the shaft 2, said shaft carrying on the outside of the cylinder, a spur gear 13 which is in mesh with a similar gear 14 on a shaft 15 which carries the abutment, said shaft extending to the outside of the cylinder.

The inlet port 9 leads from a steam chest 16 formed in the base portion of the cylinder. The steam supply pipe 17 enters one end of the steam chest. In the steam chest is mounted a rotary admission valve comprising a hollow cylinder 18 open at its end which is opposite the entrance of the steam supply pipe. The opposite end of the cylinder is closed and has an axially extending stem 19 which passes out of the steam chest, and carries on the outside thereof a spur gear 20 which is in mesh with a similar gear 21, on the shaft 15. By this gearing a rotary movement is imparted to the valve from the shaft 2, said shaft being geared to the shaft 15 as already described. In the cylinder 18 is a slit 18ª forming an outlet port for the steam entering said cylinder, and when said port arrives opposite the port 9, steam

enters the steam space 5. A cut-off valve is also provided. This valve comprises a blade 22 fitting the outside of the cylinder 18 and adapted to be shifted by a governor actuated device to be presently described, for varying the point of cut-off. The cylinder 18 is located concentrically in the steam chest and spaced from the wall thereof which leaves an annular space surrounding the cylinder. The blade 22 works in this space on one side of the port 9. On the other side of said port is an abutment 23 which bridges the space and extends into contact with the outer surface of the cylinder. Upon bringing the blade 22 closer to the port 9 the cut-off occurs earlier, and upon carrying the blade farther away from the port the cut-off takes place later. The governor-controlled means, heretofore referred to, operate to advance the cut-off when the engine is running too slow, and to retard the cut-off when the engine is running too fast.

The blade 22 is carried by spaced rings 24 encircling the valve 18. From one of the rings extends a tubular stem 25 in which the stem 19 works. Power applied to the stem 25 rotates the blade. Means are provided for rotating the blade in either direction to advance or retard the cut-off. These means will now be described.

Geared to the shaft 2 by bevel gears 26 is a shaft 27 carrying an ordinary centrifugal governor 28. The governor shaft 27 is mounted in suitable bearing brackets 29 carried by the cylinder 1. The governor is operatively connected to a sleeve 30 slidably mounted on the governor shaft. To this sleeve is connected an arm 31 connected to the stem 32 of a piston valve having spaced heads 33 and 34 connected by a stem 35. This piston valve works in a cylindrical casing 36 which is entered intermediate its ends by a pipe 37 leading from a small rotary pump 38 mounted on the shaft 27 so as to be operated by the rotation of said shaft. The inlet to the pump is a pipe 39 leading from a tank or reservoir 40 mounted on a bracket 41 carried by the cylinder 1. The ends of the valve casing 36 are connected with the tank by pipes 42 and 43 respectively. The pipe 37 is the outlet of the pump 38, and it enters the valve casing so as to discharge between the heads 33 and 34.

Opening into the casing 36 on opposite sides of the inlet 37 are pipes 44 and 45 respectively which extend to and enter a cylinder 46. The tubular stem 25 extends through this cylinder concentrically and is formed therein with a radial blade or wing 47. In the cylinder 46 is an abutment 48 which extends from the cylinder wall to the surface of the stem 25, the latter being spaced from the cylinder wall, whereby an annular space is had in the cylinder across which the abutment extends. The pipes 44 and 45 enter the cylinder on opposite sides of the abutment. It will be evident from the foregoing that when a fluid pressure is let into the cylinder through the pipe 44, the pressure on the blade 47 will carry it around in the cylinder in one direction, and when the fluid pressure enters through the pipe 45, the blade will travel in the opposite direction. Inasmuch as the blade is carried by the stem 25, the latter is rotated, whereby the blade 22 is shifted to vary the cut off in the manner hereinbefore described. The position of the valve in the casing 36 determines the flow of the fluid pressure in the pipes 44 and 45, and as the position of the valve is controlled by the governor 28, it will be seen that changes in the speed of the engine cause the valve to take different positions and thus let fluid pressure into the cylinder 46 through one or the other of the pipes 44 and 45, the blade 22 thus being shifted in a direction according to which pipe is discharging into the cylinder. The pipe which is cut off from the casing 36 carries the exhaust from the cylinder 46 into one end of the casing from which the exhaust is carried to the tank by the pipe 42 or 43 according to which end of the casing the exhaust is entering.

The distance between the valve heads 33 and 34, and the width of said heads is such that when the valve is in mid position, which is its position when the engine is running under normal speed, said heads only partly cover the inlet ends of the pipes 44 and 45, and thus establish communication between both of said pipes and the inlet 37. The fluid pressure therefore enters the cylinder 46 on both sides of the abutment 48, and both sides of the blade 47 are therefore exposed to the pressure. The blade is therefore balanced, and no movement thereof takes place. The piston heads also leave the pipes 44 and 45 partly open to the spaces between the piston heads and the ends of the valve casing 36, so that the pressure can escape through the pipes 42 and 43.

It will be seen from the foregoing that the speed of the engine is under perfect control, the mechanism being reliable in operation and responding instantly to changes in the speed. If the speed becomes sufficiently great, the blade 22 will commence to cover the port 9 and thus reduce the steam supply, and if the speed continues to increase the port will eventually be entirely closed by the blade thus shutting off steam to the cylinder 1 altogether.

I claim:

1. The combination with a fluid motor, of a controlling device therefor, a fluid-operated actuating-means for said device, a pump for supplying the motive fluid of the actuating means, and a governor-controlled

valve in the motive fluid conduit to the actuating means, said valve comprising a casing having an inlet intermediate its ends connected to the pump, outlets to the actuating means on opposite sides of said inlet, and exhaust outlets connected to its ends, and a double-headed piston valve working in the casing, said valve in its normal position establishing communication between the inlet and both outlets to the actuating means and between said outlets and the exhaust outlets.

2. The combination with a fluid motor, of a controlling device therefor, a fluid operated actuating means for said device, a pump for supplying the motive fluid of the actuating means, a reservoir to which the pump inlet is connected, and a governor-controlled valve in the motive fluid conduit to the actuating means, said valve comprising a casing having an inlet intermediate its ends connected to the pump outlet, outlets to the actuating means on opposite sides of said inlet, and exhaust outlets connected to its ends and discharging into the reservoir, and a double-headed piston valve working in the casing, said valve in its normal position establishing communication between the inlet and both outlets to the actuating means, and between said outlets and the exhaust outlets.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK C. OLNEY.

Witnesses:
H. E. SMITH,
NETTIE KING.