No. 800,684. PATENTED OCT. 3, 1905.

W. E. SCHNEIDER.

ROTARY HYDROCARBON ENGINE.

APPLICATION FILED OCT. 12, 1903.

2 SHEETS—SHEET 1.

Fig. 1.

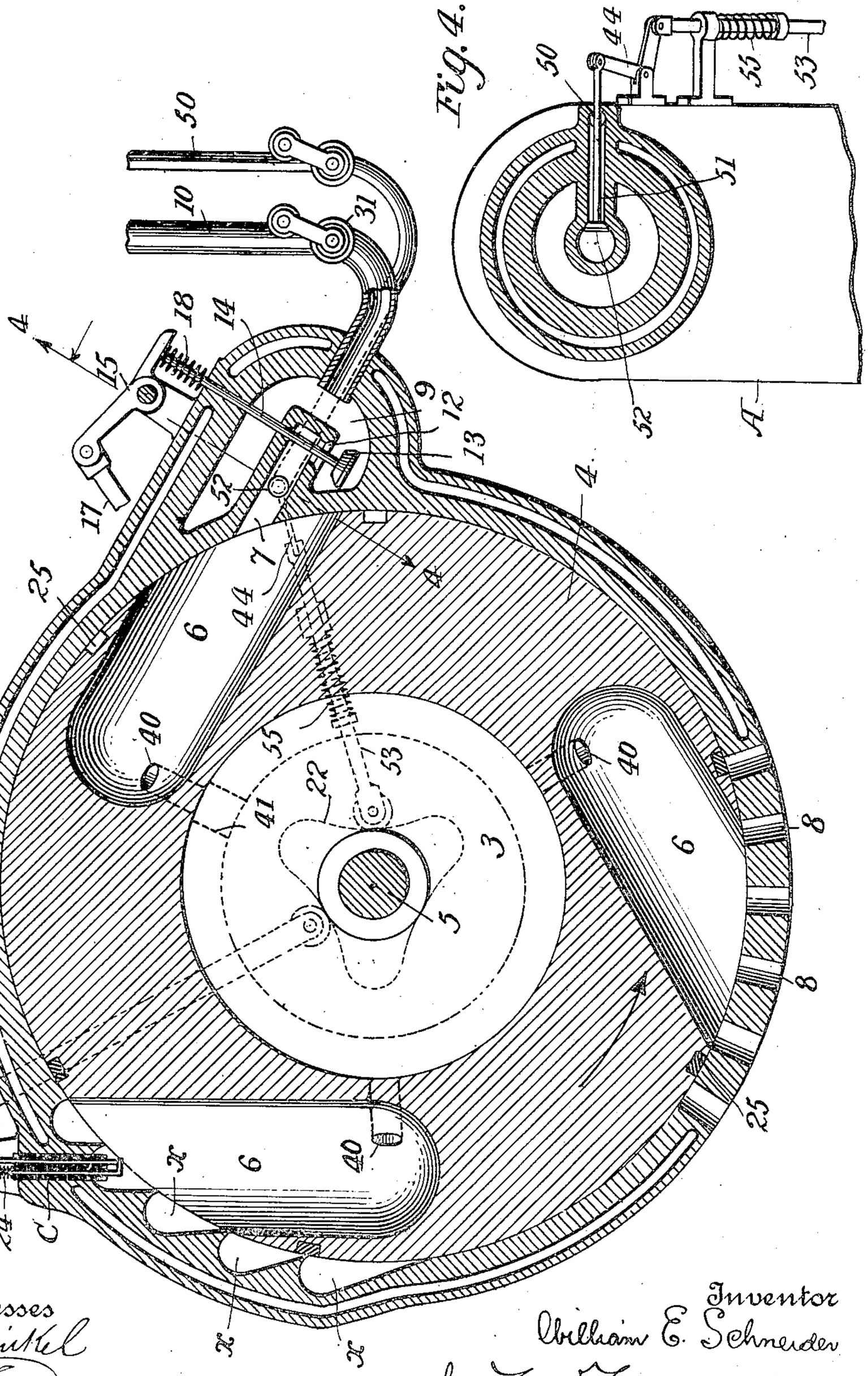

Fig. 4.

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2 SHEETS—SHEET 2.

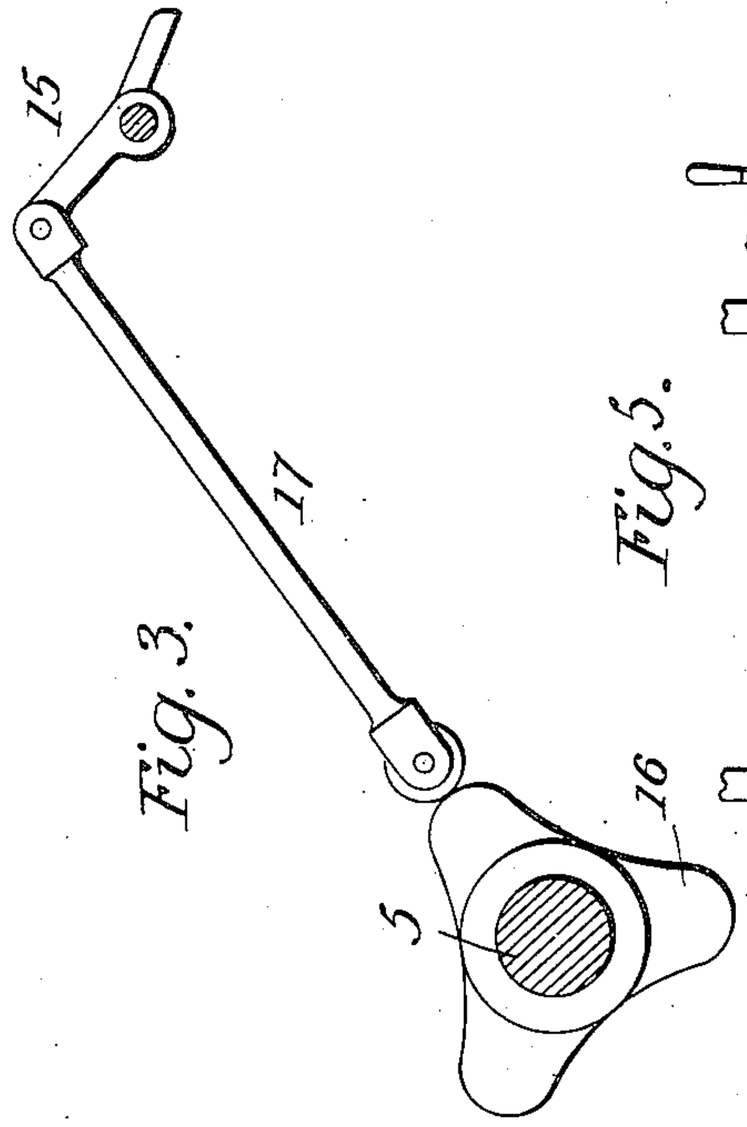

Fig. 3.

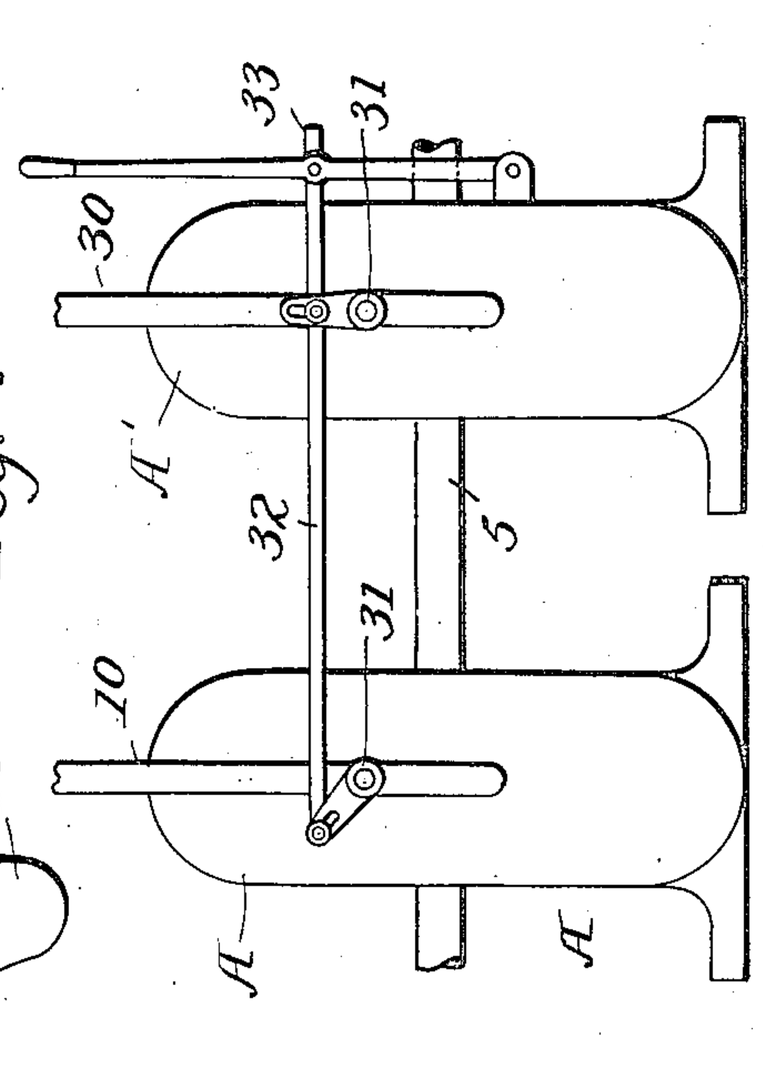

Fig. 5.

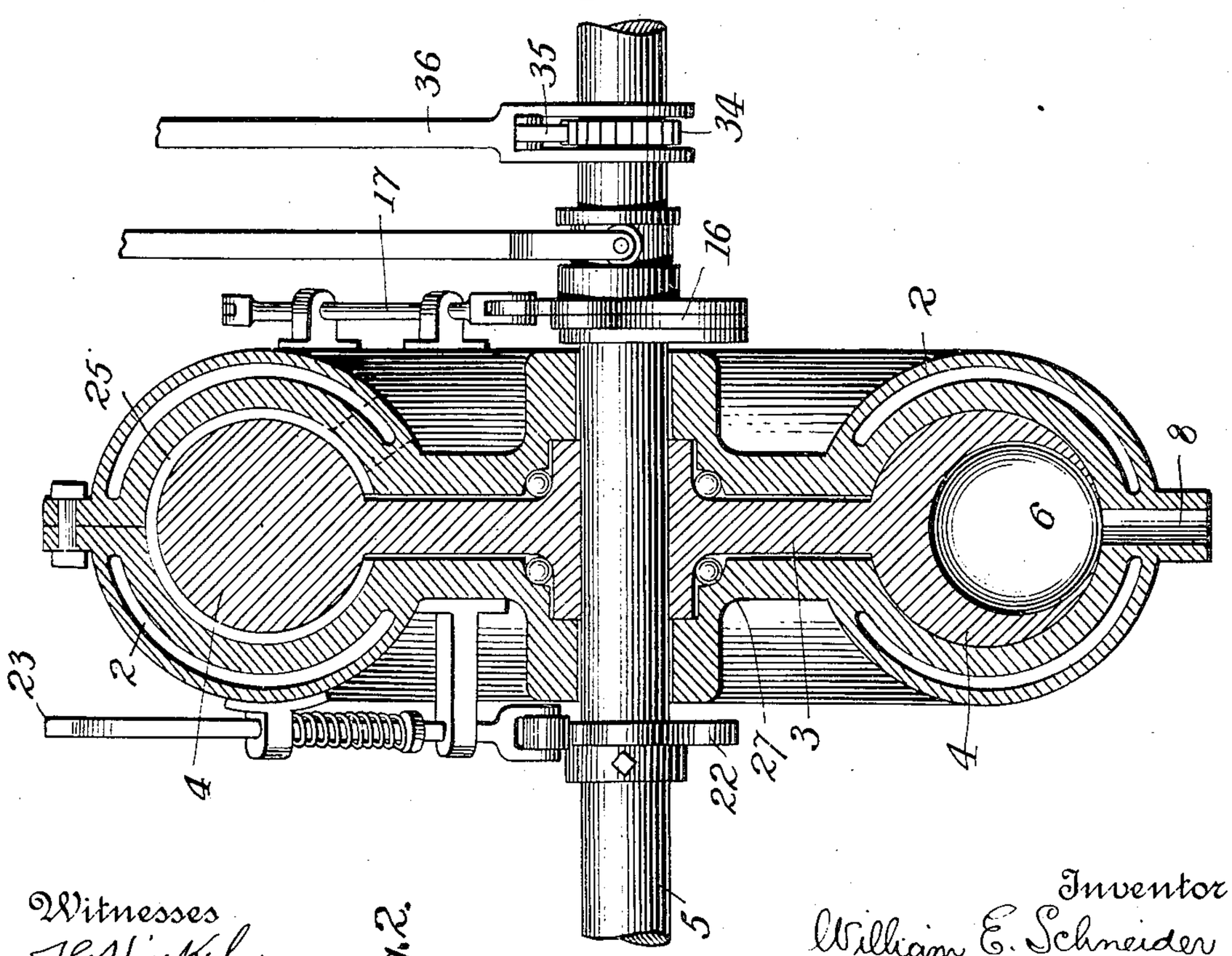

Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM E. SCHNEIDER, OF WASHINGTON, DISTRICT OF COLUMBIA.

ROTARY HYDROCARBON-ENGINE.

No. 800,684. Specification of Letters Patent. Patented Oct. 3, 1905.

Application filed October 12, 1903. Serial No. 176,720.

To all whom it may concern:

Be it known that I, WILLIAM E. SCHNEIDER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Rotary Hydrocarbon-Engines, of which the following is a specification.

My invention relates to gas-engines, and has for its object to drive a shaft by explosions in cylinders or chambers arranged tangential to the shaft, to which end I construct the engine, as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of an engine embodying my invention; Fig. 2, a transverse section; Fig. 3, a detail of the valve-operating parts; Fig. 4, a section on the line 4 4, Fig. 1; Fig. 5, an elevation showing two engines arranged to secure reversing means.

In the preferred form of construction shown the piston has a plurality of explosion-chambers, the casing A is cylindrical, with hollow walls forming a water-jacket 2, and the piston has a peripheral circular rib 4 at the edge of a disk 3, with a central hub mounted fixedly on the driving-shaft 5, which extends through bearings in the cylinder. In the piston, as shown, there is a plurality of explosion-chambers 6, although but a single chamber may be used, the said chambers being tangential and each closed at the inner end and opening at the periphery of the piston, so as to be brought successively opposite an inlet-port 7 and then opposite one or more outlet-ports 8 in the casing A, and between these two ports is arranged or operated igniting means whereby the charge introduced into the chamber through the inlet-port is exploded and thereafter escapes through the outlet port or ports on the further revolution of the piston. As the chamber is tangential, the explosion of the charge therein acting against the inner end of the chamber and against the opposing face of the interior of the casing tends to force the piston around in the direction of its arrow, and to afford a better abutment for this action I form a recess *x* in the inner face of the casing with faces so stepped or arranged as to afford abutments or pressure-faces against which the gases may act as the piston rotates. As shown, the exhaust-ports are radial and arranged so as to permit the complete escape of the gases after they have sufficiently expanded and before the piston has rotated to bring the chamber 6 opposite the inlet-port 7.

Any suitable means may be employed for forming an explosive mixture, and the same may be introduced into the chamber by any of the usual means for combining and injecting a hydrocarbon and air or any other character of explosive charge. As shown, a supply-pipe 10 communicates with a chamber 9, formed in the casing A, and this chamber communicates with the inlet-port 7 through a port 12, controlled by a valve 13. This permits the chamber 9 to receive a proper volume of mixture under high pressure, which can flow suddenly into the chamber upon opening the valve 13. As shown, the valve 13 is upon a stem 14, which is forced inward on rocking a lever 15, operated in any suitable manner from the shaft 5—as, for instance, by cams 16, acting upon a guided rod 17, connected to the lever 15, a spring 18 acting to reverse the rocking of the lever and close the valve.

The igniting means may be carried either by the piston or casing, the latter arrangement being shown and consisting of an electrical igniter C, extending into the chamber *x* and having electrodes carried out of contact by means of a cam 20 upon a rock-shaft 21, operated by cams 22, acting upon a guided rod 23, bearing upon a lug on the shaft 21, and by rocking the latter depressing one of the electrodes to carry it out of contact with the other suddenly, a spring 24 serving to lift the electrode into contact after the explosion.

It will be evident that but a single igniter is required for any number of chambers, it only being necessary to provide a number of cams 22 corresponding to the number of chambers.

In order to prevent the escape of gases, the annular head of the piston is recessed to receive annular packings 25, as shown.

In order to reduce friction, there may be antifriction-balls 27 between the piston and the casing, so arranged as to take the direct bearing of the piston from the casing.

In some cases it is desirable to allow the spent gases to be forced out of the rear of the chamber as a new charge is introduced at the front, and to permit this the chamber may have a rear port 40, which when the chamber is in position to receive a new charge may communicate with the port 41 in the casing, this latter port being of such a length that the port 40 will be closed before the new charge has passed entirely to the end of the chamber.

The engine as thus described is capable of

acting only in one direction. In order to reverse, I make use of a second engine A′, Fig. 5, of the same character as the first, except that the piston secured to the same shaft 5 has the chamber or chambers 6 open in the opposite direction. The second engine has an inlet-pipe 30, and each inlet-pipe 10 30 has a valve 31, and the stems of the two valves are connected by a link 32 in such manner that when one valve is open the other will be closed. It is therefore only necessary to shift the link 32, which may be done by a hand-lever 33, in order to throw the supply from one engine to the other, when the exploding charges will act with a reverse effect. It will be seen that the piston of the engine which is not operating constitutes practically a fly-wheel for the shaft 5 and for the engine which is operated.

In order to start the engine in the first place and bring the chamber 6 into proper position to receive the charge and then into position to cause the charge to be exploded, some means should be provided for readily turning the shaft 5—as, for instance, a ratchet 34 on the shaft engaged by a pawl 35, carried by a lever 36, which swings upon a shaft, or any other suitable means may be employed.

When it is desired to spray the oil into the cylinder, compressed air from the pipe 10 may pass to the channel communicating with the port 7, and oil may be admitted to said channel from a pipe 50, communicating with a port 51. This port is controlled by a valve 52, moved from the cams 22 through a rod 53 and lever 44, a spring 55 tending to shift the parts to close the valve.

Without limiting myself to the precise construction shown, I claim—

1. A motor having a casing, a cylindrical piston mounted to revolve therein and provided with a tangential chamber open at the periphery, means for introducing an explosive charge into said chamber at one point of the revolution of the piston, and means for exploding the charge at another point of said revolution, substantially as set forth.

2. A motor having a casing, a cylindrical piston mounted to revolve therein and provided with a tangential chamber open at the periphery, means for introducing an explosive charge into said chamber at one point of the revolution of the piston, means for exploding the charge at another point of said revolution, and a recess or recesses in the casing at the point where the charge is exploded, substantially as set forth.

3. A motor having a casing, a cylindrical piston mounted to revolve therein and provided with a plurality of tangential chambers open at the periphery, means for introducing an explosive charge into said chambers in succession at one point of the revolution of the piston, means for exploding each charge at another point of said revolution, and an exhaust-port beyond the point where the charge is exploded, substantially as set forth.

4. A motor having a casing, a cylindrical piston mounted to revolve therein and provided with a tangential chamber, open at the periphery, an inlet-port in the casing arranged to communicate with the chamber at one point of the revolution of the piston, an outlet-port in the casing at another point, and means for exploding the charge in the chamber between said two ports, substantially as set forth.

5. A motor having a casing, a cylindrical piston mounted to revolve therein and provided with a tangential chamber open at the periphery, an inlet-port in the casing arranged to communicate with the chamber at one point of the revolution of the piston, an outlet-port in the casing at another point, means for exploding the charge in the chamber between said two ports, and a valve controlling the admission of the charge to the inlet-port, substantially as set forth.

6. A motor having a casing, a cylindrical piston mounted to revolve therein and provided with a plurality of tangential chambers open at the periphery, an inlet-port in the casing arranged to communicate with the chamber at one point of the revolution of the piston, a receiving-chamber for the charge communicating with the inlet-port, an outlet-port in the casing at another point, means for exploding the charge in the chamber between said two ports, and a valve controlling the admission of the charge to the inlet-port, substantially as set forth.

7. The combination with the casing, rotating piston having a tangential chamber and means for supplying a charge to said chamber, of a rear port in the piston and a port in the casing arranged to correspond with the port in the piston when the chamber is receiving a new charge, substantially as set forth.

8. The combination of the casing, shaft, piston having a tangential chamber open at the outer end, means for introducing explosive charges into and subsequently exploding them in said chamber, and means for rotating the shaft from outside the casing, substantially as set forth.

9. The combination in a reversible engine, of a shaft carrying two pistons with tangential explosion-chambers reversely arranged, a casing inclosing each piston, means whereby explosive charges may be introduced to the chambers of either piston at will, and means for exploding the charges after being thus introduced, substantially as set forth.

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

WILLIAM E. SCHNEIDER.

Witnesses:

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E. WARRINER.