

A. FINCH.
 REVERSIBLE ROTARY GAS OR OIL ENGINE.
 APPLICATION FILED NOV. 20, 1906.

937,298.

Patented Oct. 19, 1909.

2 SHEETS—SHEET 1.

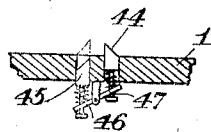
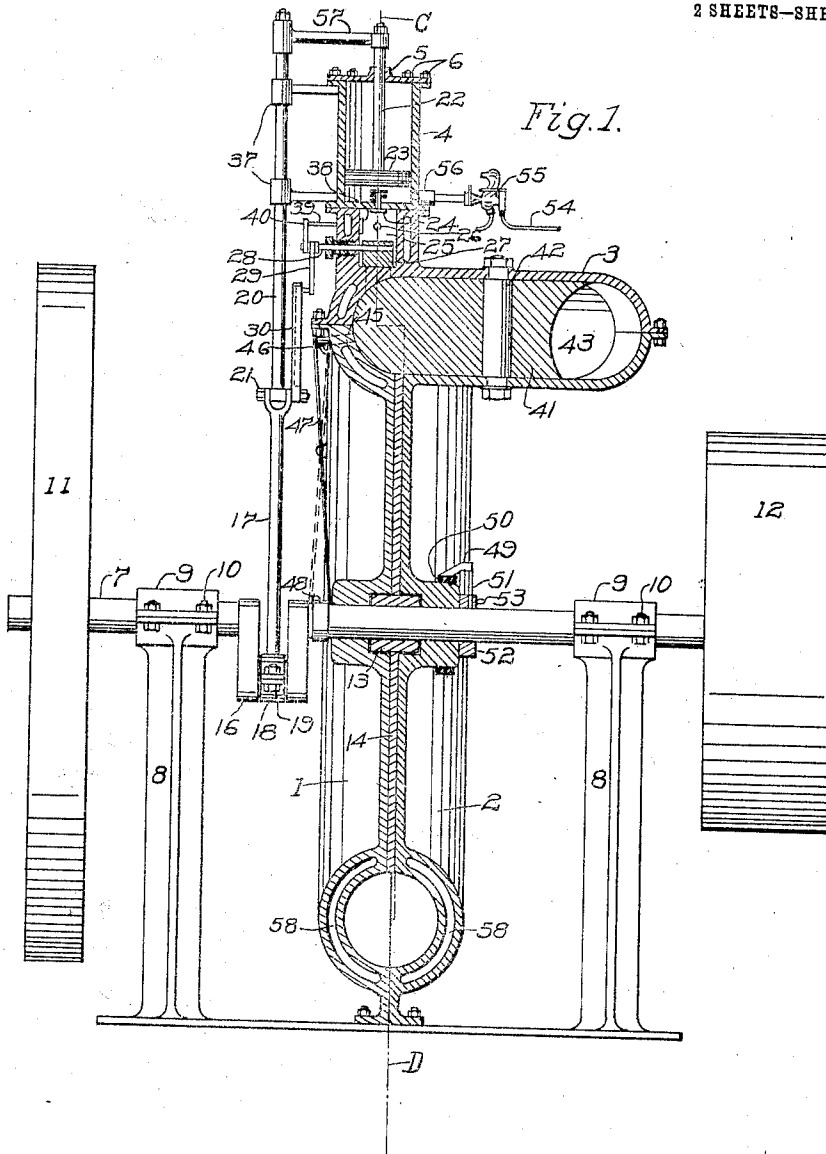


Fig. 4

WITNESSES:

Mr. A. Seave
C. E. Hyman

INVENTOR.

BY

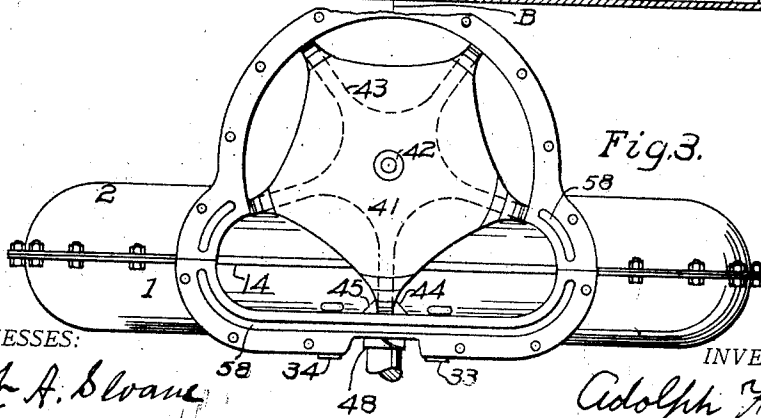
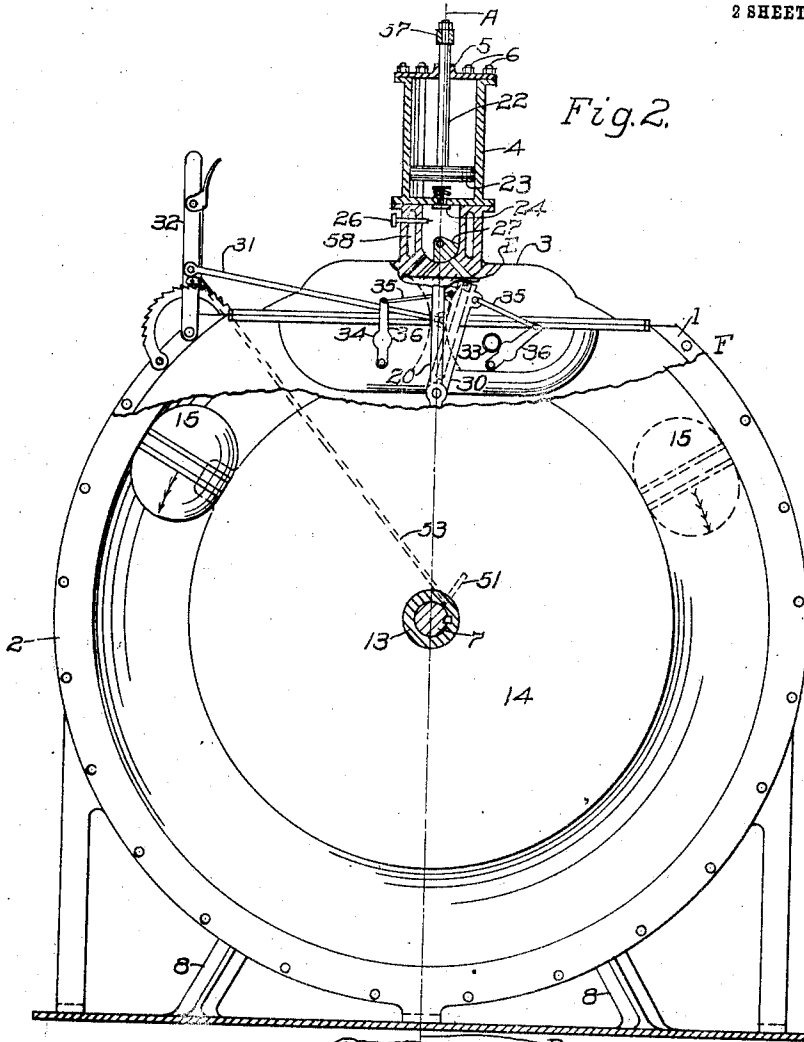
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2 SHEETS—SHEET 2.



WITNESSES:

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ADOLPH FINCH, OF SAN DIEGO, CALIFORNIA.

REVERSIBLE ROTARY GAS OR OIL ENGINE

937,298.

Specification of Letters Patent.

Patented Oct. 19, 1909.

Application filed November 29, 1903. Serial No. 344,315.

To all whom it may concern:

Be it known that I, ADOLPH FINCH, a citizen of the United States, residing at San Diego, in the county of San Diego and State of California, have invented a new and useful Reversible Rotary Gas or Oil Engine, of which the following is a specification.

My invention relates to improvements in rotary, gas or oil engines, in which the piston rotates inside of an annular shaped cylinder.

The objects of my improvements are, first, to provide for reversing the direction of the piston at any time while the engine is running, thereby increasing its adaptability. Second, economy, by lessening the loss caused by a more detailed construction. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the engine through A—B in Fig. 2, but with an outside view of shaft, pulleys, supports and rods. Fig. 2 is a vertical section of the engine, through C—D in Fig. 1. Except that portion between broken lines E and F which shows the outside including levers. Fig. 3 is a top view of the engine, after the removal of the top cover marked 3, and minus the shaft, supports, pulleys, rods, etc. Fig. 4 is a top view showing the operation of the latches and lever 46.

Similar characters of reference refer to similar parts throughout the several views.

The body of the engine is formed by bolting together parts 1 and 2, and then securing the cover 3 on the top.

4 is the compressor cylinder which is fitted on the top of cover 3, and has a head 5, secured thereto by bolts 6.

7 is the main shaft running through the body 1 and 2, and is supported by the frame and boxes 8, which are fitted with cover 9, and secured by bolts 10.

11 represents a fly-wheel, and 12 a pulley, which are secured to the ends of the main shaft 7.

13 represents the hub, which is secured to the shaft 7, and to which is secured the annular plate 14, which has a projection, on which is secured the piston 15, which rotates in the annular cylinder formed by bolting 1 and 2 together.

In the main shaft 7 is formed a double crank at 16, as shown in Fig. 1, to which is attached crank-rod 17, by means of cap 18 and secured by bolts 19, one on each side.

To the crank-rod 17 is attached rod 20, by means of a pin 21, and operates the rod 20 through the guides 37, thereby keeping rod 20 centrally located. At the upper end of rod 20 is attached rod 57 by means of a nut on the top, and rod 20 being reduced in size leaving shoulders for rod 57 to fit against.

22 is the compressor piston-rod, which is attached to rod 57. Rod 22 being reduced and a nut on the top. On the lower end of rod 22 is secured piston head 23. Said piston head is for the purpose of compressing the gases in the cylinder 4, while the engine is running, and is operated by means of the double crank on the main shaft 7. The compressed gases are forced from the cylinder 4 through the valve 24, into the ignition chamber 25, which is part of the cover 3.

26 is the spark plug for igniting the compressed gases. The ports from the ignition chamber 25 are opened and closed by the operation of the valve 27, which is operated by means of the crank 29, attached to valve stem 28, and which works in the groove in lever 30, giving it a cam action, thereby partly rotating the valve 27. The lever 30 being connected to rod 31, as shown in Fig. 2, which is attached at the other end to hand lever 32. By the backward movement of the lever 32, the lever 30 is thrown to the other side of the rod 20, to which it is attached by means of pin 21, thereby causing the valve 27 to rotate over to the other port, allowing the gases to enter the chamber the opposite side of the rotary abutment 41, and by the same movement of lever 30 the exhaust port 33 is closed and the exhaust port 34 opened, by means of rod 35 connected with valves 36, as shown in Fig. 2. This produces a reversal of the direction of the piston head 15, causing it to rotate as shown in dotted lines in Fig. 2, the exhaust port 34 being open and exhaust port 33 closed.

When the engine is in operation and the valves 24 and 27 are closed after the explosion, the remaining gases in combustion in the ignition chamber escape through the valve 32, as shown in Fig. 1, which is operated by the valve stem 39 by means of the lever 40, attached to valve stem 28.

41 represents a rotary abutment, as shown in Figs. 1 and 3. It is fitted in the top part of the engine body 1 and 2, and closed in on the top by the cover 3, and rotates on the pin 42, in either direction. Said rotary abutment acts as a divider of the gases and keeps

the newly exploded gases from going to the opposite direction, which would cause back pressure on the piston 15, and prevent its escape through the open port in the opposite direction. Said rotary abutment 41 has ribs or webs 43, one of which in rotating, projects into the cylinder and is prevented from returning by the latches 44 and 45, which are provided with a spring which presses them inward, and are so shaped that they are pushed back when the cutoff wheel rotates, and spring back into position after the rotary abutment web 43 passes and prevents its return. Said latches are so connected to a lever 46, as shown in Figs. 1 and 4, and pivoted on its center to a bracket attached to body 1. Said lever is attached at a point between the center and the latch connection as to cause the right movement in and out of the latches 44 and 45 to another lever 47 running downward to the main shaft 7, which is fitted with a sleeve 48, which has a groove running through and around in cam form so that when shaft is reversed, the lever moves to the other side of sleeve as shown by dotted lines in Fig. 1, thereby upon reversal of shaft, latch 44 is thrown out and 45 is thrown in, or vice versa. Upon each revolution the piston is brought in contact with the rotary abutment 41, at the point of the web 43, thereby revolving said rotary abutment 41 and leaving it in position for each revolution of the piston 15.

49 shows an electroconductor attached to and insulated by the insulation 50 from the engine body 3, and 51 represents the sparking pin connected with the main shaft 7 by a non-conducting sleeve 52, secured to shaft 7. A rod 53, extending from and connected to sleeve 50 and to hand lever 32, and connected thereto, causing sleeve 50 to rotate around shaft 7, upon the backward movement of the lever 32 when reversing the engine, thereby causing a reversal of the sparking device by the same operation. Both 49 and 51, to be electrically connected with spark plug 26, in the ignition chamber 25, to give the spark for the explosion at whatever part of the revolution of the piston it is desired. The conductor 49 is so fitted that it can be adjusted to any position desired, by means of a rod 53, connected to lever 32, said lever may be operated while the machine is in motion, so that the spark in the ignition chamber can be made at any part of the revolution of the piston. The annular plate 14, takes up the space between the two parts of the body of the engine 1 and 2, and from the hub 13, to the inner line of the cylinder.

54 represents the pipe for conducting the gas or oil to the compressor cylinder 4, through carbureter 55 and check-valve 56.

58 represents a space for the circulation of water in parts 1 and 2 and 3.

To the ignition chamber 25, is connected a safety valve for the purpose of releasing any premature explosion that might accidentally occur therein.

I prefer to carry out my invention in the manner above described as illustrated, in the drawing, but do not wish to be limited so long as I keep within the scope of the invention.

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

1. In a reversible rotary gas engine, the combination of a main engine shaft, a separable frame comprising an annular cylinder, a rotary abutment cylinder, an ignition chamber and a compression cylinder connected thereto, an annular plate or disk, a single projection on its periphery to which is fitted an annular elliptical piston with cylinder rings to fit said annular cylinder, said annular plate secured to the said main engine shaft, a rotary abutment provided with webs in said abutment cylinder and operated at each revolution by the said elliptical piston, a piston in said compression cylinder, means for operating said compression piston automatically, means for igniting gas in said ignition chamber automatically, a double inlet port valve between said ignition chamber and said abutment cylinder, and adapted to be shifted so as to conduct the fuel mixture to either side of a dividing web of said abutment and to operate automatically so as to allow a periodic flow of fuel mixture into said abutment cylinder, the operation of the parts being simultaneous with the rotation of the said main engine shaft, all substantially as set forth.

2. In a reversible rotary gas engine, the combination of a main engine shaft, a separable frame comprising an annular cylinder, a rotary abutment cylinder, an ignition chamber and a compression cylinder connected thereto, an annular plate or disk, a single projection on its periphery to which is fitted an annular elliptical piston with cylinder rings to fit said annular cylinder, said annular plate secured to the said main engine shaft, a rotary abutment provided with webs in said abutment cylinder and operated at each revolution by the said elliptical piston, abutment latches for preventing the backward movement of said abutment, a piston in said compression cylinder, means for operating said compression piston automatically, means for igniting gas in said ignition chamber automatically, a double inlet port valve between said ignition chamber and said abutment cylinder, means for shifting said inlet port valve so as to conduct the products of combustion to either side of a dividing web of said abutment, and to operate automatically, so as to allow a periodic

flow of fuel mixture into said abutment cylinder, the operation of the parts being simultaneous with the rotation of said main engine shaft, separate means for reversing
5 the direction of the travel of the piston, said separate means consisting of a hand lever connected to the engine body, a rod attached thereto and connected to a cam or slotted lever adapted to simultaneously shift the
10 valve from one inlet port to the other to

open one exhaust port and close the other and to change the position of the abutment latches, another rod attached to said lever and to a portion of the sparking device, all substantially as set forth.

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Witnesses:

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