L. S. MORRIS.

INTERNAL COMBUSTION ENGINE.

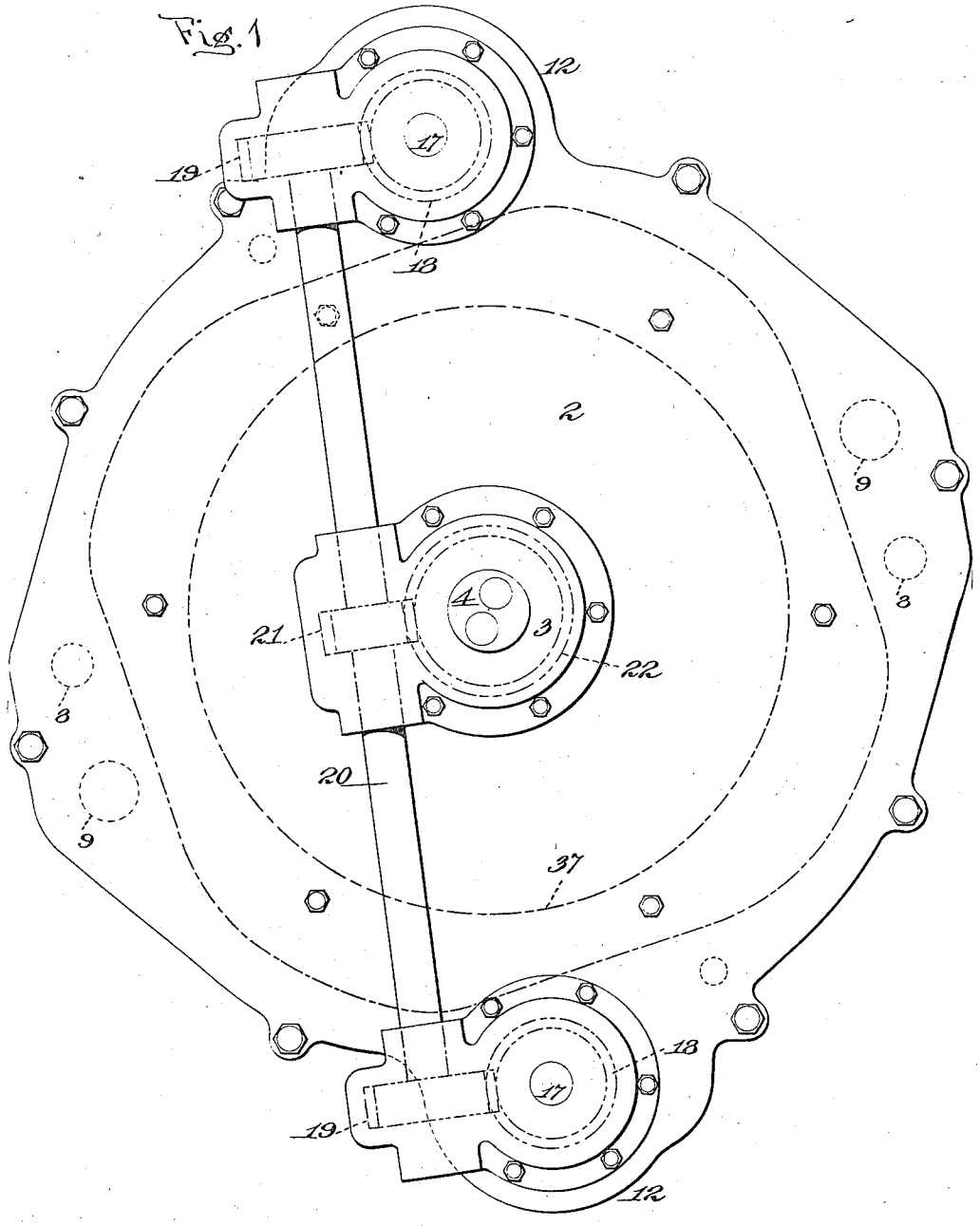
APPLICATION FILED AUG. 13, 1914.

1,228,806.

Patented June 5, 1917.

3 SHEETS—SHEET 1.

Fig. 1



Witnesses:

John L. Lotsch

M. Jones

Inventor

Louis S. Morris

by Waldo G. Morse, Attorneys.

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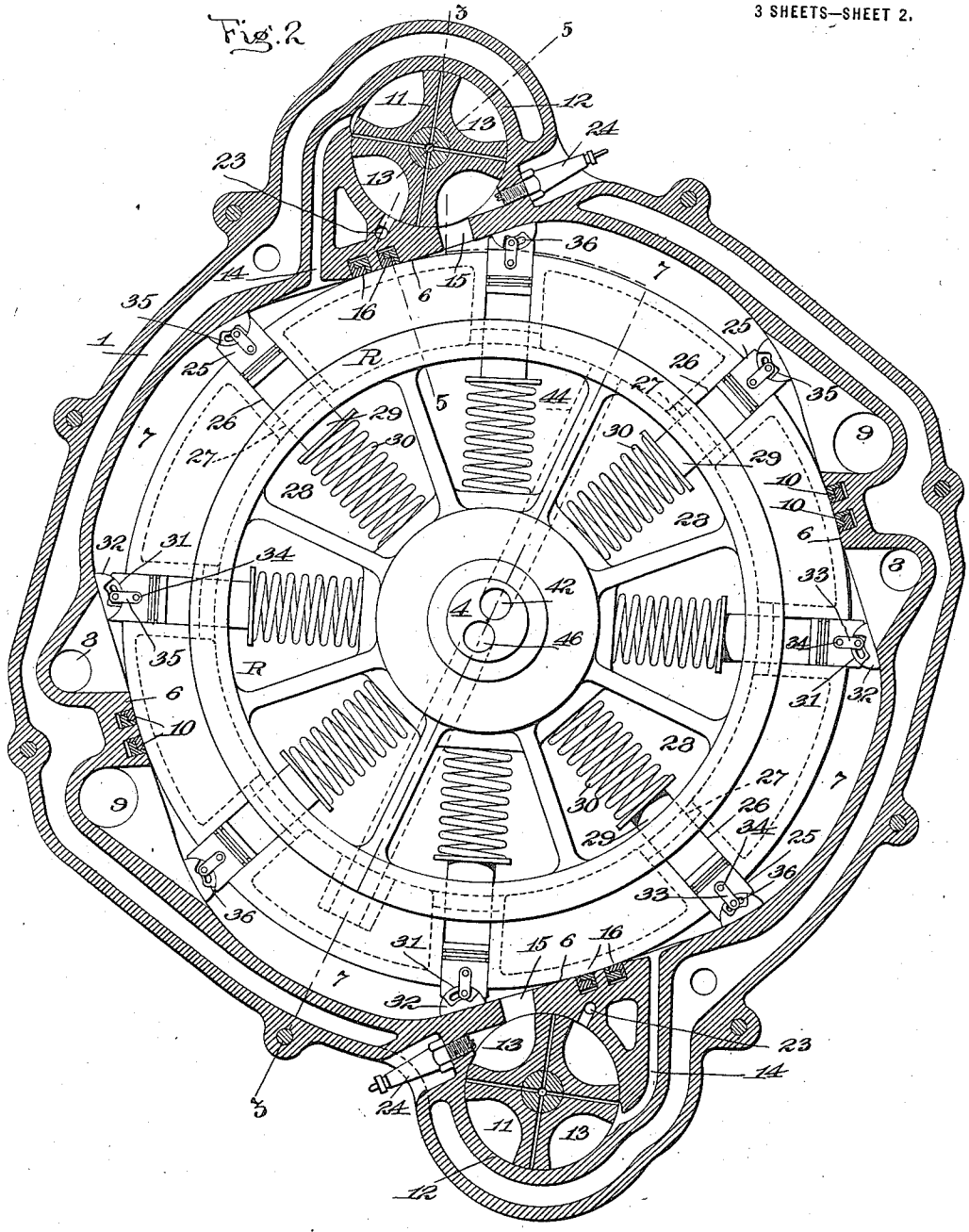
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3 SHEETS—SHEET 2.

Fig. 2



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M. Jones.

Inventor

Louis S. Morris

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3 SHEETS—SHEET 3.

Fig. 3

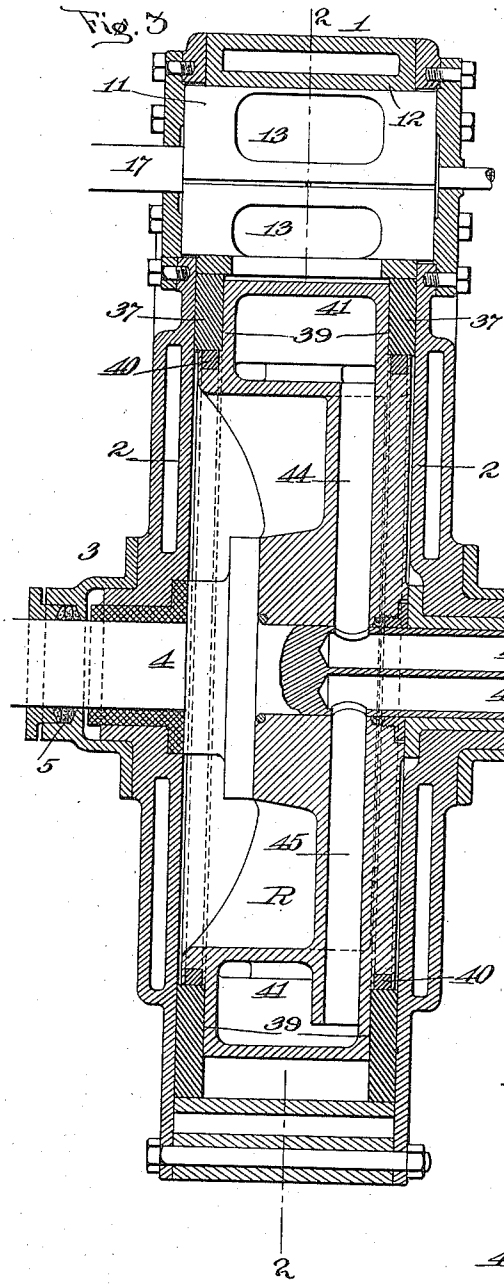


Fig. 4

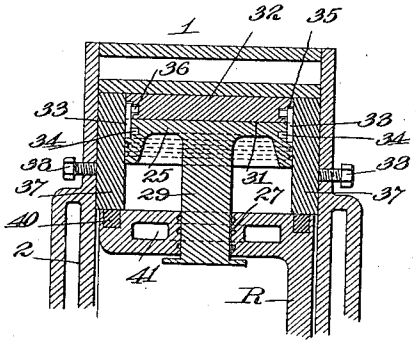
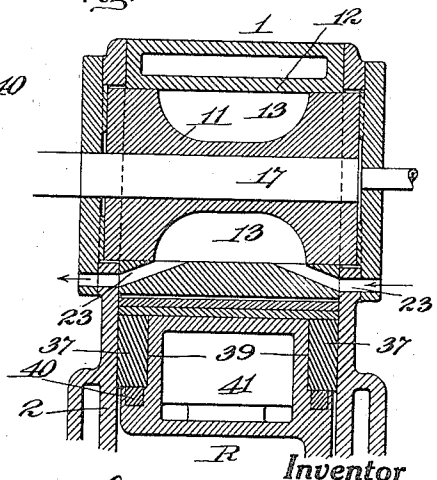


Fig. 5



Witnesses:

John L. Lotsch

M. Jones.

Inventor

Louis S. Morris

by Waldo G. Morse, Attorneys.

UNITED STATES PATENT OFFICE.

LOUIS S. MORRIS, OF BRIDGEPORT, CONNECTICUT.

INTERNAL-COMBUSTION ENGINE.

1,228,806. Specification of Letters Patent. Patented June 5, 1917.

Application filed August 13, 1914. Serial No. 856,624.

To all whom it may concern:

Be it known that I, LOUIS S. MORRIS, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented a certain new and useful Internal-Combustion Engine, of which the following is a specification.

My invention relates to internal combustion engines of the rotary type wherein there is provided a rotor carrying sliding pistons which, acting in conjunction with the rotor and stator, will draw in the explosive mixture, compress it and, on the explosion of the charge, the rotor will be rotated and draw in and compress new charges which, when ignited will continue the operation. The particular type of engine to which my present improvement more particularly relates, is disclosed in my co-pending application for patent filed March 31, 1914, and numbered serially 828,536.

The object of my invention is to simplify the construction of the device by eliminating, to a large extent, reciprocating parts.

Another object is to provide means for cooling the rotor.

A further object is to provide means for effecting a supplemental scavenging of the device.

These and further objects will appear from the following specification and accompanying drawings taken together or separately.

My invention is illustrated in the following drawings in which the same parts are designated by corresponding reference characters in all the figures.

Figure 1, is a side elevation of my improved engine.

Fig. 2, is a transverse section of the same taken on the line 2—2 of Fig. 3.

Fig. 3, is a longitudinal section taken on the line 3—3 of Fig. 2.

Fig. 4, is a detail sectional view through one of the piston slides, and

Fig. 5, is a detail section taken on the line 5—5 of Fig. 2.

A stationary casing or stator is employed and may be securely fastened to a floor or other foundation. The stator is composed of an annular body 1 and side members 2, 2. The body is constructed of an outer and an inner shell, and the space between the shells, when closed by the side members, forms a water jacket as is usual. Each side member is provided with a bearing 3 for the support of the shaft 4 of the engine to which is rigidly secured a rotor R. The bearings are equipped with glands 5, 5 to prevent leakage along the shaft.

The bore of the stator is not cylindrical in its entirety but is, in the embodiment of the invention chosen for illustration, composed of four cylindrical segments 6 of the same diameter as the rotor, and four eccentric portions 7 each having a maximum radius somewhat greater than that of the rotor. These eccentric portions are disposed around the bore of the body at 90 degrees apart and each, when the rotor is in position, forms a chamber gradually increasing in depth from one edge at part 6 to the maximum depth, then extending concentric with the part 6, then gradually decreasing in depth to the nearer edge of the adjacent part 6.

The body 1 is provided with two diametrically opposite inlet ports 8, 8, and two diametrically opposite exhaust ports 9, 9. The inlet and exhaust ports on each side of the body are separated from each other by the length of a section 6, and each section is provided with two packing strips 10, 10. These strips extend across the length of the bore of the rotor and are forced into intimate engagement with the periphery of the rotor by the pressure of leakage gas behind them.

In the embodiment of the invention illustrated I show two rotary transfer valves 11, 11, diametrically opposite each other, each carried in a valve casing 12 forming part of the body and each is spaced approximately 90 degrees from the inlet and exhaust ports between which it is situated. The valve comprises a cylindrical body having four equally spaced pockets 12 around its periphery. Each valve casing 12 is provided with an inlet port 14 and an outlet port 15 and between these ports, in the bore of the stator, is a segment 6 within the boundaries of which are packing strips 16 similar in all respects to the packing strips 10. The valve inlet port 14 offers communication between one of the spaces or pockets 7, and the valve casing, and the valve exhaust port 15 is between the valve casing and another space or pocket 7. Each valve

stem 17 is provided, outside the casing, with a spiral gear 18 which meshes with a spiral gear 19 carried on a shaft 20. This shaft at its center is geared to the engine shaft 4 through spiral gears 21 and 22. The gears are so proportioned as to rotate the valves 11 at twice the speed of the engine shaft.

Each valve is provided with conduits through which lubricating oil may be forced to the periphery of the valve.

If desired the stator may be provided with channels 23 by means of which the valve pockets 13 may be scavenged.

Adjacent to each valve exhaust port 15, I provide a spark plug 24 or other charge igniting device.

The rotor R fits within the bore of the stator and its periphery forms a close working contact with the segments 6 and strips 10 and 16, and, as shown in my application for patent above referred to, is provided with a plurality, in the present embodiment eight, of piston slides 25 each carried in a radial slot 26 extending inward from the periphery of the rotor. The slots 26 are rectangular in cross section and extend entirely across the face of the rotor. The bottom of each slot is provided with a cylindrical bore 27 communicating with a pocket 28 in the rotor.

The piston slide 25 is composed of a rectangular body fitting and sliding within a slot 26. The inner side of the body is provided with a shank 29 which passes through the bore 27 and is engaged by a spring 30 seated in the pocket 28. Between the body of the piston slide 25 and the slot 26 I provide baffle grooves to prevent leakage at that point and I also have baffle grooves between the shank 29 and the bore 27 for the same purpose.

The outer face of each piston slide is provided with a semi-cylindrical channel 31 in which is seated a semi-cylindrical face block 32. The outer face of the block is adapted to be forced into intimate contact with the bore of the stator.

In order to prevent the block 32 from being thrown from its socket by centrifugal action when the engine is running, I provide the following mechanism. Each end of the piston slide is recessed to receive a link 33 which is held against longitudinal displacement by a pin 34 in one end of the link. The other end of the link lies within a segmental recess 35 in the end of the block 32 and has a stud which engages a curved slot 36 in the bottom of the recess. This construction, while it prevents displacement of the block, still permits it to rock in the channel as its outer face follows the contour of the bore of the stator.

Disposed within the stator at each side thereof is an annular cheek plate 37 the opening in which is a true cylinder and the outer periphery is shaped to the same configuration as the bore of the stator. The side plates 2 carry set screws 38 by means of which the cheek plates may be adjusted relatively to the side plates and to the rotor. The rotor is provided at each side with an annular recess 39 in which the cheek plates rest. The bottom of each recess has a circumferential groove which carries a ring 40 to prevent leakage between the cheek plates and the rotor.

A very important object of my present invention is to provide for cooling the rotor and to this end I provide the same with a chamber 41 extending around the entire wheel. The shaft 4 has a water inlet passage 42 in communication with an annular space 43 in a fitting carried on one of the bearings 3. Within the rotor is a cold water duct 44 connecting the inlet passage with the chamber 41. Diametrically opposite the duct 44 is a return duct 45 which offers communication between the chamber and an outlet passage 46 in the shaft 4. The duct 45 does not communicate with the inner part of the chamber but its opening is near the outer periphery of the chamber. The outlet passage 46 connects with an annular space 47 in the same fitting in which the space 43 is located. The spaces 43 and 47 are separated from each other by a water tight packing and the fitting is suitably packed to prevent leakage at its ends.

The operation of my improved device is as follows:

With the parts in the position shown in Fig. 2 the rotor will be turned in the clock wise direction by any well known means, and as the piston slides nearest the inlets 8 are moved, the spaces behind them are filled with the proper mixture of gas and air which flows in to fill the spaces left by the movements of the slides. This mixture will remain uncompressed in the space 7 behind the slide until the next slide passes the inlet 8 and the first slide passes the strips 16. The charge will now be compressed, on account of the diminishing in size of the space 7, and forced into the valve inlet port 14. From the port 14 the compressed mixture will enter a pocket 13 in the transfer valve which is also traveling in the clock-wise direction and when the pocket containing the compressed charge comes into communication with the valve outlet port 15 the charge will be exploded by means of the sparker 24 and the expanded gas will act on the rear of the first piston slide, which in the meantime has passed the port 14, and drive it ahead. The products of combustion will be driven from the exhaust 9 by the second piston slide which follows the first and is acted on by the charge compressed by the piston slide following it. The strips 16 will prevent the exploding charge from exerting

pressure rearwardly and the strips 10 will prevent the products of combustion from mixing with uncompressed gas at the inlet.

Should it be found necessary to scavenge the pockets in the transfer valve, the same may be accomplished by passing a current of air or other fluid through the ducts 23 by any suitable device working in time with the engine.

The cooling of the rotor is accomplished as follows: Cold water enters the passage 42 and flows out to the chamber 41. The centrifugal force of the rotor will tend to force the water outward and it will accumulate in the chamber 41 until such chamber is filled, be driven down the duct 45 against the centrifugal force exerted therein and out of the shaft through the duct 46.

In accordance with the provisions of the patent statute I have now described my invention together with the apparatus which I consider to represent the best embodiment thereof, but I desire to have it understood that the invention disclosed in the drawings is merely illustrative and that the invention may be carried out in other ways without departing from the spirit of my invention.

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

An internal combustion engine comprising a stator and a rotor, a fuel inlet, a spring pressed piston slide, an oscillatory face block carried by the piston slide, a plurality of links for securing the block to the slide, and recesses in the block to permit the block to oscillate.

This specification signed and witnessed this 17th day of July, 1914.

LOUIS S. MORRIS.

Witnesses:
T. C. CUMMING,
E. E. DILLESTON.