

Oct. 5, 1926.

1,602,018

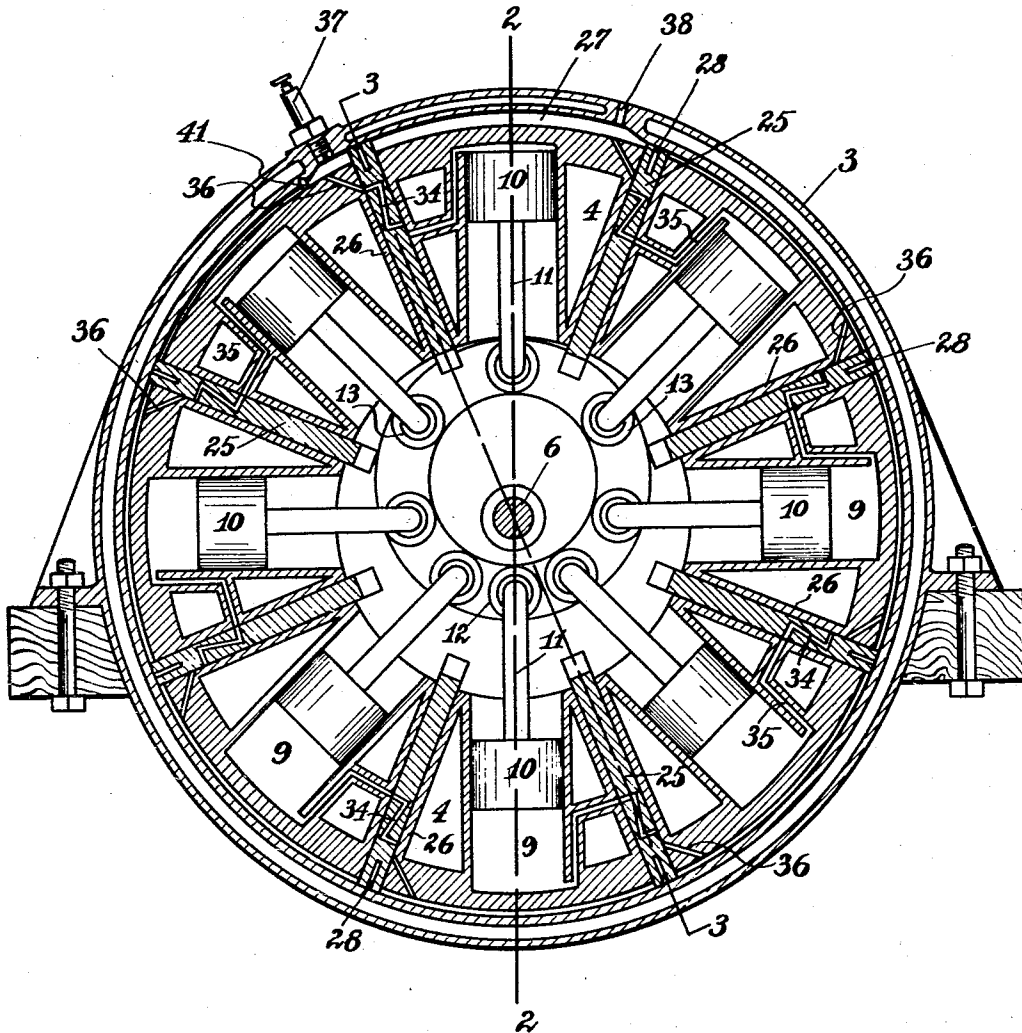
T. HARVEY

INTERNAL COMBUSTION ROTARY ENGINE

Filed August 23, 1923

4 Sheets-Sheet 1

FIG. 1



INVENTOR
THOMAS HARVEY

BY

Harry O. Schroeder
ATTORNEY

Oct. 5, 1926.

1,602,018

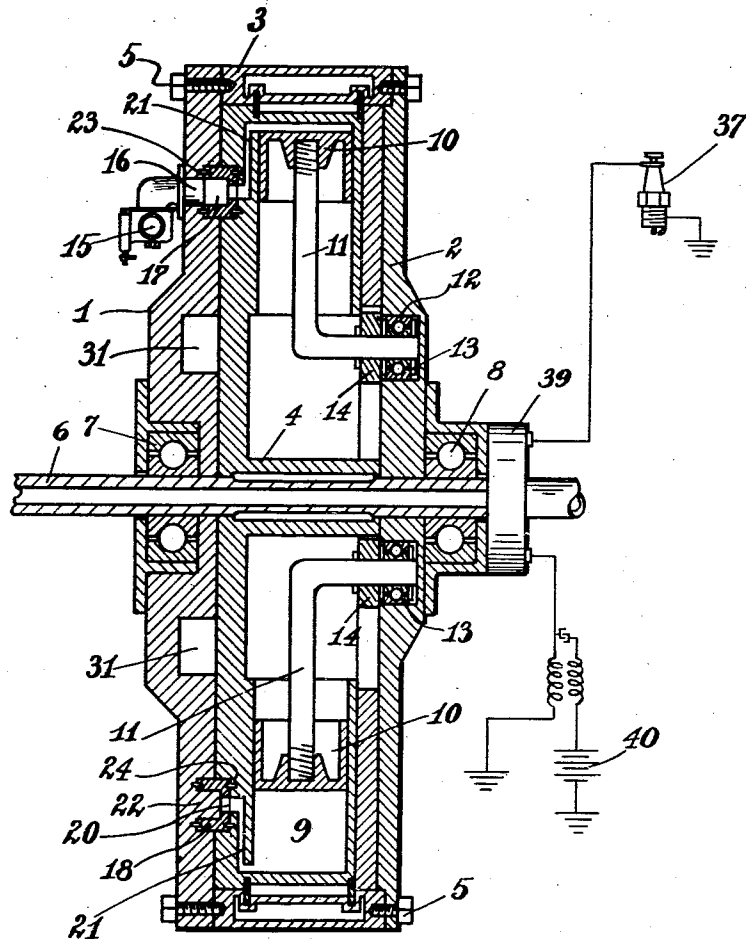
T. HARVEY

INTERNAL COMBUSTION ROTARY ENGINE

Filed August 23, 1923

4 Sheets-Sheet 2

FIG. 2



INVENTOR
THOMAS HARVEY

BY
Harry C. Schwed
ATTORNEY

Oct. 5, 1926.

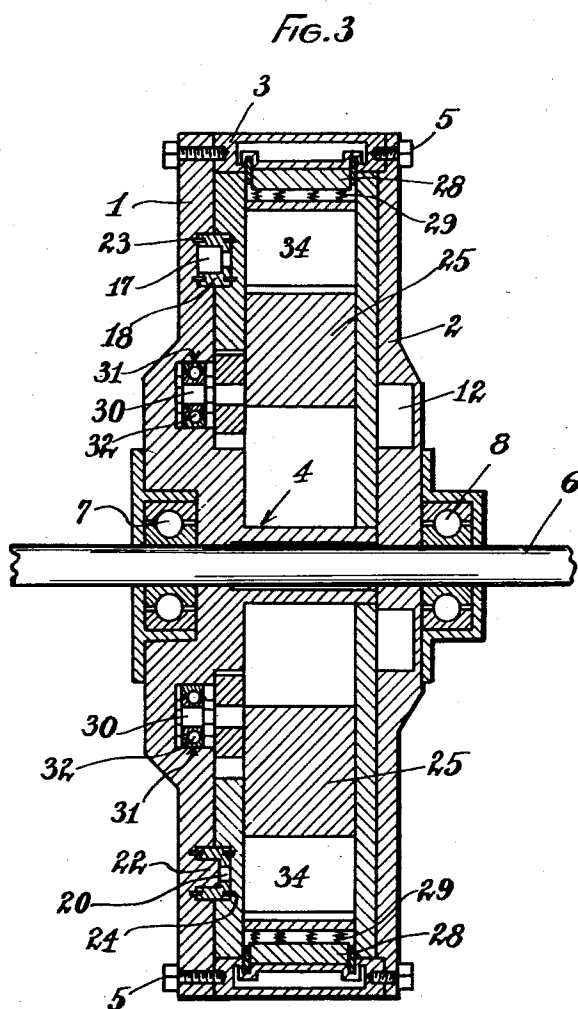
1,602,018

T. HARVEY

INTERNAL COMBUSTION ROTARY ENGINE

Filed August 23, 1923

4 Sheets-Sheet 3



INVENTOR

THOMAS HARVEY

BY

Harry C. Schroeder
ATTORNEY

Oct. 5, 1926.

1,602,018

T. HARVEY

INTERNAL COMBUSTION ROTARY ENGINE

Filed August 23, 1923

4 Sheets-Sheet 4

FIG. 4

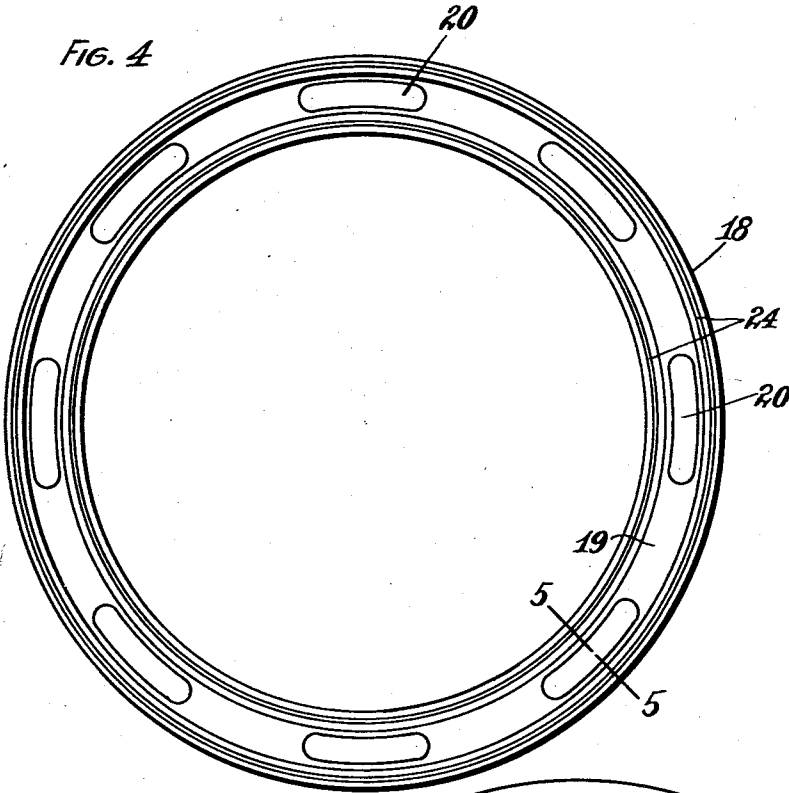


FIG. 5

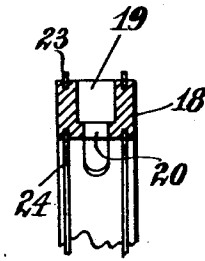
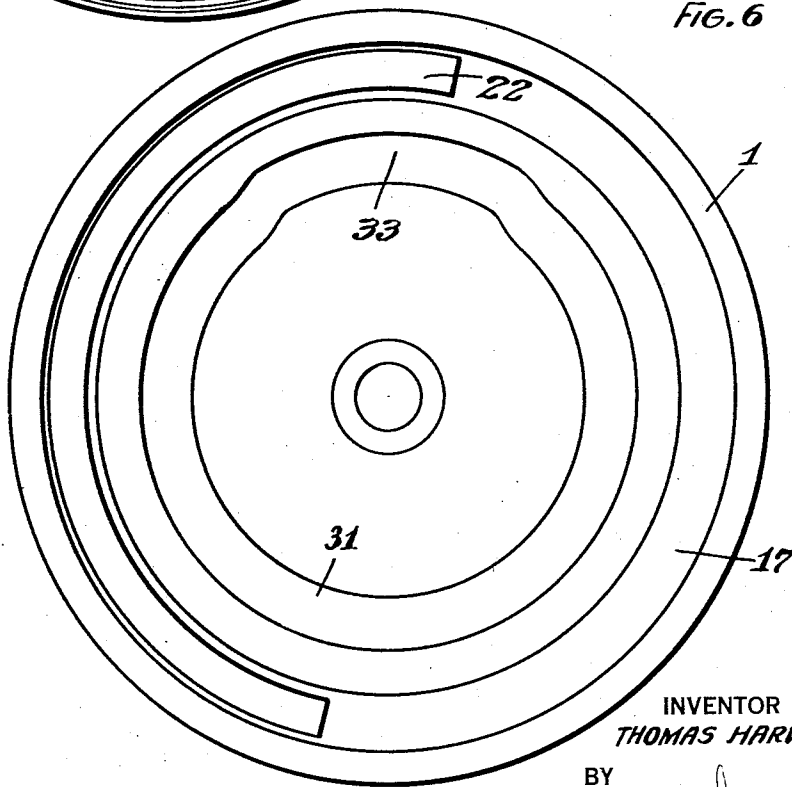


FIG. 6



INVENTOR
THOMAS HARVEY

BY

Harry A. Schroeder
ATTORNEY

Patented Oct. 5, 1926.

1,602,018

UNITED STATES PATENT OFFICE.

THOMAS HARVEY, OF BERKELEY, CALIFORNIA.

INTERNAL-COMBUSTION ROTARY ENGINE.

Application filed August 23, 1923. Serial No. 658,917.

My invention is an improved internal combustion rotary engine.

The object of my invention is to provide an engine which is simple in construction and efficient in operation.

Another object of my engine is to compress the mixture in various cylinders in the rotor, and then inject it into the explosion chamber on the periphery of the rotor, thereby getting a plurality of explosions; i. e., one for each cylinder.

In the annexed drawing I have shown the preferred form of my invention, but it may also be embodied in other forms, and in this application I wish to cover my invention in whatever form it may be embodied.

Referring to the drawings:

Figure 1 is a longitudinal sectional view of my engine.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a side view of the intake ring.

Figure 5 is a sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a side view of one of the stationary side members.

Referring more particularly to the drawing, my engine consists of two stationary side plates 1 and 2 which are spaced by a circumferential ring 3, and a rotor 4 adapted to rotate between said plates. The plates 1 and 2 are suitably secured to the ring 3, as with cap screws 5. The rotor 4 is keyed to a shaft 6, which is journaled in bearings 7 and 8 in the plates 1 and 2 respectively.

A plurality of radially positioned cylinders 9 are formed in the rotor 4, and pistons 10 are adapted to reciprocate in said cylinders. Pitmen 11 are secured to the pistons 10 and are bent at right angles to enter an eccentric groove 12 in the plate 2. The pitmen 11 enter bearings 13 which rotate in the groove 12. As the rotor 4 rotates the bearings 13, pitmen 11 and pistons 10 will reciprocate an amount corresponding to the eccentricity of the groove 12. A plate 14 is secured to each of the pitmen 11 adjacent the bearings 13 and bears against the plate 2, thus reinforcing the pitman against twisting out of proper alignment. The explosive mixture which is formed in the carburetor 15 is drawn through a port 16 in the plate 1 into the intake chamber 17 in said plate. An intake ring 18 fits within the

chamber 17 and rotates with the rotor 4. This ring has an annular groove 19 cut therein which faces outwardly, and a plurality of intake ports 20 are cut in the rear wall into the groove 19, one port for each cylinder. Ports 21 are formed in the rotor 4 and open into the top of the cylinders 9 and into the ring ports 20. Thus the explosive mixture is drawn into the cylinders 9 on the downward stroke of the pistons 10, through the ports 20 and 21 from the chamber 17. This intake occurs during the entire downward stroke of the piston 10. A 180 degree arcuate block 22 is formed in the chamber 17, the purpose of which is to close the ports 20 on the upward stroke of the piston. The block 22 fits within the groove 19 and bears against the bottom of said groove, thus effectually closing the ports 20 and permitting the piston to compress the mixture in the cylinder. Rings 23—23 and 24—24 are set in the outer and inner face respectively of the intake ring 18 and bear against the plate 1 and rotor 4 respectively to prevent any leakage of gases around the ring.

Blades 25 are slidably mounted in guides 26 between each pair of cylinders 9 in the rotor 4. The object of these blades is to form a firing chamber around each cylinder 9. A firing pocket 27 is formed in the inner face of the ring, and the blades 25 are moved outwardly into this pocket to form a wall against which the expanding gases push to rotate the rotor 4. Each of the blades 25 has a yieldable scraper plate 28 set in the end thereof, against springs 29. As the blades arrive at the edge of the pocket 27 they are moved upwardly therein to form a gas tight seal in the following manner: Pins 30 project from the bottom of the blades 25 into a cam groove 31 in the plate 1. Bearings 32 are positioned on the pins 30 and travel in the groove 31. A cam 33 is formed of the groove 31 which corresponds to the pocket 27, and as the pins 30 arrive at the cam they are moved upwardly which projects the blades into the pocket. The cam 33 is substantially the same height as the depth of the pocket 27.

Compression chambers 34 are formed in the blades 25, and ports 35 are formed in the rotor 4 and extend from the top of the cylinders 9 to the bottom of the chambers 34, when the blades are in the normal position. Ports 36 are formed in the rotor 4 and extend through the periphery thereof,

and when the blades 25 are in their raised position the port is opened into the top of the chambers 34 to permit the gas to flow into the entering end of the pocket 27.

6 A spark plug 37 is set in the ring 3 and enters the pocket 27. An exhaust port 38 is formed in the ring 3 from the leaving end of the pocket 27, through which the burnt gases escape.

10 A suitable distributor 39, distributes the electricity from a battery 40 to the spark plug 37 at the proper intervals, depending on the number of cylinders in the rotor 4. A scraper plate 41 is positioned in the ring 3 at the entering end of the pocket 27 and presses against the rotor 4, thus preventing the escape of gas from the pocket.

The operation of my invention is as follows: Taking a cylinder after it has passed the pocket 27, the piston 10 is moving downwards, and drawing gases from the chamber 17 through the port 21 into the cylinder 9. As the piston starts to move upwardly block 22 closes the port 21 and the gas is 25 compressed. The blades 25 being in their normal position the port 35 opens into the chamber 34 and the gases are compressed therein. As the blades 25 reach the pocket 27, they are moved upwardly away from the port 35 and open the port 36 which allows the compressed gas to enter the pocket and it is ignited by the plug 37. The expanding gas presses against the blade 25 and rotates the rotor 4.

35 Having described my invention I claim:

1. An engine comprising a rotor, bearings in which said rotor is mounted, a stationary ring, said ring having a firing pocket formed therein, cylinders in said rotor, pistons in 40 said cylinders, means to reciprocate said pistons, blades in said rotor, stationary side plates, one of said plates having a cam groove formed therein, a pin formed on said blades and adapted to project into said 45 groove, whereby said blade is moved into the pocket, said blades having a compression chamber formed therein, said blades being provided with by-passes to conduct the compressed gas to said chamber, and means to 50 conduct the compressed gas to the firing pocket from said chamber when the blade is projected into the pocket, and means to fire the gas in said pocket.

2. An engine comprising a rotor, a stationary ring having a firing pocket formed therein, a plurality of cylinders within said rotor, pistons adapted to reciprocate therein, a radially movable blade for each cylinder, said blade having a compression chamber 60 therein, said compression chamber being adapted to communicate with said pocket when the upper end of said blade is within said pocket and to communicate with one of the cylinders for the remaining part of its 65 rotation.

3. An engine comprising a rotor, a stationary ring having a firing pocket formed therein, cylinders within said rotor, a piston within each cylinder, said rotor being provided with by-passes thru which combustible 70 gases are conducted to the cylinders on the suction stroke of the pistons, radially movable blades carried by said rotor each of which is provided with a compression chamber, said rotor being provided with ports 75 communicating with the outer ends of said cylinders and in communication with said compression chambers on the compression stroke of said piston, means whereby said blades are moved outwardly when the pocket 80 is reached and ports carried by said rotor and communicating with said pocket and also communicating with said compression chambers when the blades project into the 85 pocket.

4. An engine comprising a rotor, a stationary ring having a firing pocket formed therein, cylinders carried by said rotor, a piston within each cylinder, stationary side walls supporting said stationary ring, one 90 of said walls being provided with an annular intake chamber, an intake ring within said intake chamber, said intake ring being provided with an annular groove and intake ports communicating with said annular 95 groove, an arcuate block located within said intake chamber and extending for approximately 180 degrees, said arcuate block being adapted to close said intake ports on the compression strokes of said pistons, said 100 rotor being provided with ports communicating with said intake chamber and with the upper ends of said cylinders so that said cylinders will be in communication with said intake chamber unless said intake ports 105 are closed by said block, the other wall adapted to support said ring being provided with an eccentric groove, pitmen extending from said piston to said last mentioned groove so that as said pistons reciprocate, said rotor will be rotated. 110

5. An engine comprising a rotor, a stationary ring having a firing pocket formed therein, a plurality of cylinders within said rotor, pistons adapted to reciprocate therein, 115 a radially movable blade for each cylinder, said blade having a compression chamber therein, said compression chamber being adapted to communicate with said pocket when the upper end of said blade is within 120 said pocket and to communicate with one of the cylinders for the remaining part of its rotation, and, pitman means whereby the outer ends of said blades are at all times pushed against the inner periphery of said 125 stationary ring.

6. An engine comprising a rotor, a stationary ring having a firing pocket formed therein, a plurality of cylinders within said rotor, pistons adapted to reciprocate there- 130

in, a radially movable blade for each cylinder, said blade having a compression chamber therein, said compression chamber being adapted to communicate with said pocket 5 when the upper end of said blade is within said pocket and to communicate with one of the cylinders for the remaining part of its rotation and pitman means whereby the outer ends of said blades are at all times 10 pushed against the inner periphery of said stationary ring, said last mentioned means comprising a pin carried by each blade and projecting into a cam groove within one of the side walls of said stationary ring.

15 7. An engine comprising a rotor, a stationary ring having a firing pocket formed therein, a plurality of cylinders within said rotor, pistons adapted to reciprocate therein, a radially movable blade for each cylinder, 20 said blade having a compression chamber therein, said compression chamber being adapted to communicate with said pocket when the upper end of said blade is within said pocket and to communicate with one 25 of the cylinders for the remaining part of its rotation and pitman means whereby the outer ends of said blades are at all times pushed against the inner periphery of said stationary ring, said last mentioned means

comprising a pin carried by each blade and 30 projecting into a cam groove within one of the side walls of said stationary ring, said cam groove being of the same configuration as the inner periphery of said stationary 35 ring.

8. An engine comprising a rotor mounted in bearings, a stator surrounding said rotor and provided with a firing recess, cylinders in said rotor, pistons in said cylinders, means to reciprocate said pistons, recip- 40 rotable blades in the rotor between the respective cylinders, guides for said blades, stationary side plates enclosing said cylinders and blades, one of said side plates 45 having a cam groove on its inner face, means on said blades coacting with said cam groove to move the blades into said firing recess, said blades having a compression chamber and communicating by-passes 50 formed therein, and means forming passage ways in the guides, blades and peripheral portion of the rotor adapted to establish communication between the firing recess and the closed end of the cylinder when the 55 blades are respectively projected into said firing recess.

In testimony whereof I affix my signature.
THOMAS HARVEY.