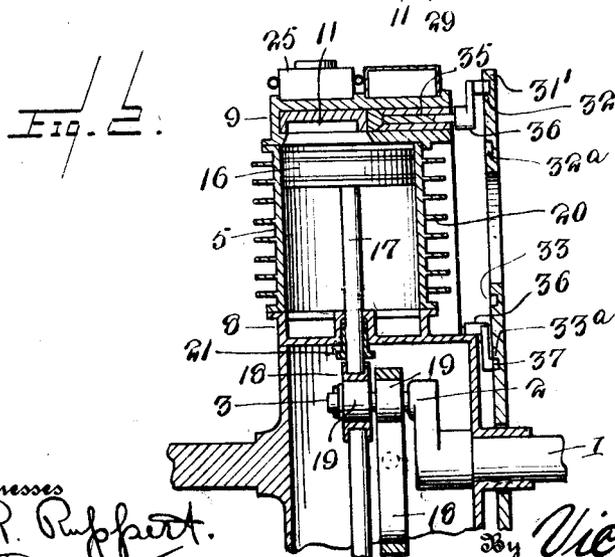
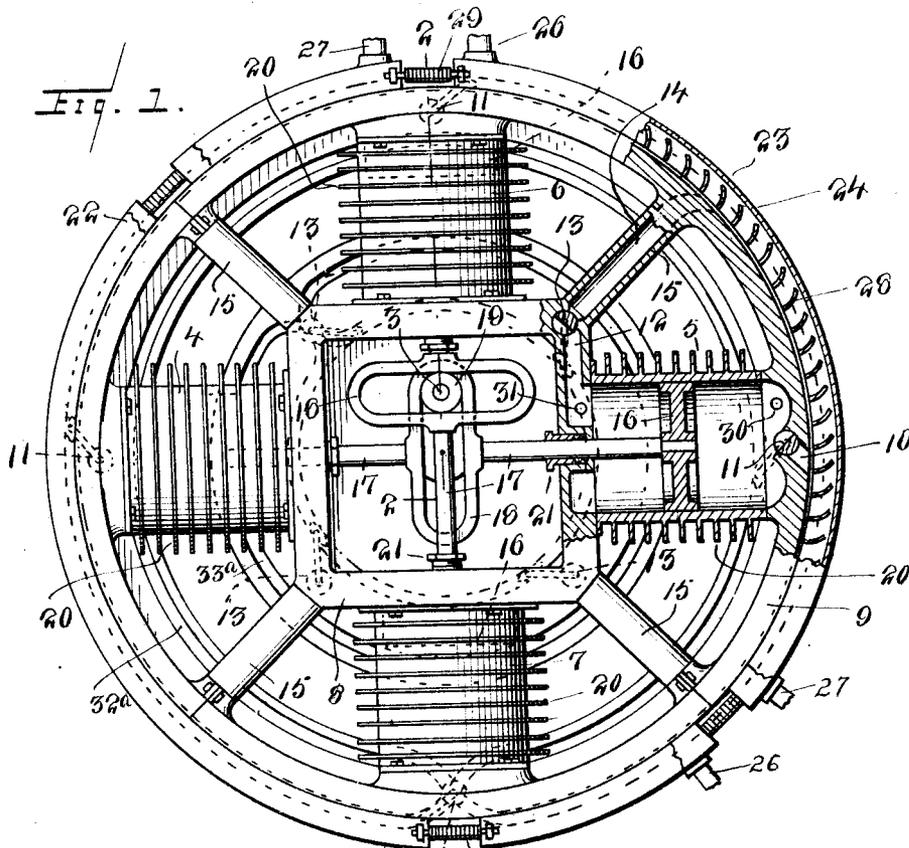


S. S. SUTTON.
 INTERNAL COMBUSTION ENGINE.
 APPLICATION FILED DEC. 13, 1913.

Patented Sept. 22, 1914.
 2 SHEETS-SHEET 1.

1,111,682.



Witnesses
 E. R. Ruffert.
 R. M. Smith

Inventor
 I Simon S. Sutton
 Victor J. Evans
 Attorney

S. S. SUTTON.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED DEC. 13, 1913.

Patented Sept. 22, 1914.
2 SHEETS-SHEET 2.

1,111,682.

Fig. 3.

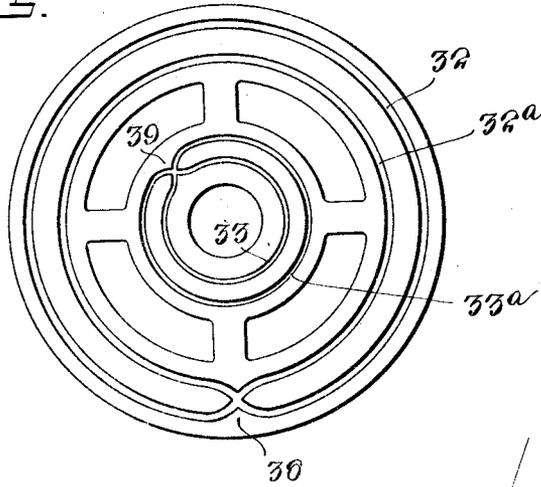


Fig. 4.

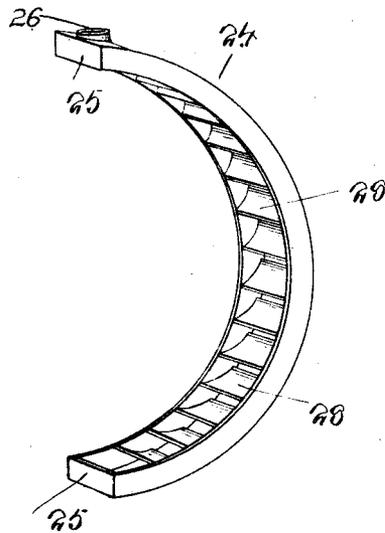


Fig. 5.

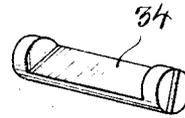
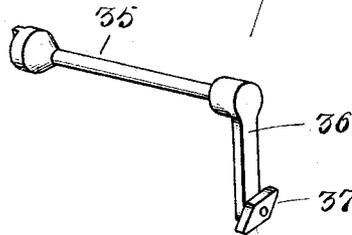


Fig. 6.



Witnesses
E. P. Ruppert
R. M. Smith

Inventor
Simon S. Sutton
By Victor J. Evans
Attorney

UNITED STATES PATENT OFFICE.

SIMON S. SUTTON, OF ELDORADO, ILLINOIS.

INTERNAL-COMBUSTION ENGINE.

1,111,682.

Specification of Letters Patent. Patented Sept. 22, 1914.

Application filed December 13, 1913. Serial No. 806,628.

To all whom it may concern:

Be it known that I, SIMON S. SUTTON, a citizen of the United States, residing at Eldorado, in the county of Saline and State of Illinois, have invented new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal combustion engines, the object of the invention being to produce an engine of light and compact construction especially adapted for use in automobiles, air craft and the like and embodying in connection with a stationary crank shaft and stationary intake and exhaust chambers, a circular series of rotating cylinders embodying reciprocating pistons all operatively related to the same crank shaft and each embodying intake and exhaust ports at the opposite ends thereof which are valve-controlled and which are in communication with the intake and exhaust chambers during each cycle of operation.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts, as will hereinafter be more fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a front elevation on an engine embodying the present invention, parts thereof being broken away in section. Fig. 2 is a diametrical section on the line 2—2 of Fig. 1. Fig. 3 is an inside face view of the cam plate. Fig. 4 is a detail perspective view of either the intake or exhaust chamber. Fig. 5 is a detail perspective view of one of the valves. Fig. 6 is a detail perspective view of the valve operating connections.

Referring to the drawings 1 designates a stationary or non-rotating crank shaft provided with a single crank 2 and crank pin 3, all of the pistons being connected to the common crank pin 3 as illustrated in Figs. 1 and 2.

In connection with the single crank shaft above referred to I employ a circular series of rotating cylinders 4, 5, 6 and 7, the cylinders 4 and 5 being arranged in opposition to each other while the other cylinders 6 and 7 are oppositely located as clearly shown in Fig. 1. All of these cylinders are connected to a common crank case 8 which is shown as square or rectangular in form while said cylinders are connected at their outer end or heads by means of an annular rim 9. Each

cylinder is provided at its outer end with a port 10 forming alternately an inlet and exhaust port and controlled by means of a valve 11 in the form of a plug similar to an ordinary stop cock. Each cylinder is also provided in the inner end or head thereof with another port 12 forming alternately an inlet and an exhaust port and being controlled by a valve 13 similar in form and construction to the valve 11 which controls the port in the outer head of the cylinder. Associated with the port 12 and the valve 13 is an inlet and exhaust passage 14 in the form of a hollow spoke 15 which extends from the crank case outwardly to the rim 9 as clearly shown in Fig. 1, the outer end of the passage 14 being deflected so as to receive and discharge gas in a direction substantially tangential to the rim 9 and the intake and exhaust chambers hereinafter particularly described.

Mounted to reciprocate in each of the cylinders is a piston 16 and extending inwardly from each piston 16 is a piston rod 17, oppositely located pistons being connected to a slotted link 18 which moves back and forth in the crank case 8. As there are four cylinders illustrated in the accompanying drawings, there are two sets of oppositely located pistons and two slotted links 18 which as shown in Fig. 1 extend at right angles to each other. Both of these slotted links 18 embrace the crank pin 3 which is surrounded by a ball or roller bearing 19 adapted to travel back and forth in the slotted links 18 and to reduce friction to a minimum.

Each of the cylinders is shown as provided with air cooling flanges or rings 20 but it will be understood that any desired cooling system may be employed. However, in engines of the rotating cylinder type, the air cooling flanges have been found efficient in practice and are further advantageous in that they materially reduce the weight of the engine as a whole by reason of the fact that no water circulation system is needed. Each piston rod 17 passes through a stuffing box 21 in the inner head of the cylinder.

The crank case 8 may be filled or partially filled with water to cool the connecting rods and adjacent parts.

22 and 23, respectively, designate intake and exhaust chambers each being of segmental form and being arranged in concentric relation to the crank shaft 1. Each

of said chambers is constructed as shown in Figs. 1 and 4, embodying an imperforate outer wall 24, closed ends 25 and inlet and exhaust nozzles 26 and 27 at the opposite ends thereof to which suitable intake and exhaust connections may be attached for carrying gas to and taking the same off from said intake and exhaust chambers. In each of said chambers angularly disposed vanes 28 are provided, said vanes terminating at their outer edges short of the inner surface of the outer wall 24 so that the fresh or exhaust gas may pass around said vanes, the exhaust gas impinging against said vanes as the cylinders rotate and thereby causing a reaction of the exhaust gas against the rim connecting the outer heads of the cylinders, it being noted that the ports 10 and 14 are pitched at an angle so as to discharge the exhaust gas directly against and approximately at right angles to the inner concave faces of the vanes 28, each of said vanes being substantially concavo-convex in cross section as indicated in Fig. 1.

The intake and exhaust chambers 22 and 23 are each slightly less than a semi-circle and they are held snugly against the outer periphery of the rim 9 by means of contractile springs 29 as shown in Fig. 1, said springs being terminally connected to the adjacent ends of the chambers 22 and 23. These chambers 22 and 23 are connected in any suitable manner to the supporting frame (not shown) of the engine so that they are held stationary while the remainder of the engine hereinabove described including the crank case, cylinders and rim 9 revolve within and between the said intake and exhaust chambers. Each cylinder is provided adjacent to the opposite heads thereof with spark plug openings 30 and 31 so as to ignite the charges at both sides of the piston 16 thereby obtaining a double impulse and giving the engine a maximum power.

In order to properly operate and time the valves 11 and 13, a cam plate 31' is arranged at one side of the engine as shown in Fig. 2, said plate being provided in its inner face with two sets of grooves 32 and 32^a designating the outer groove and 33 and 33^a, the inner set of grooves, the outer set of grooves controlling the outer valves 11 and the inner set of grooves controlling the inner valves 13. Each valve 11 or 13 as the case may be is formed as shown in Fig. 5, having one side cut away as shown at 34 to allow the gas to pass by it when turned to a certain position. The valve 34 is mounted on a shaft or stem 35 provided at one end with an operating crank 36 carrying a pivotally mounted shoe or runner 37 which is adapted to traverse either set of grooves in accordance with the valve to which it is connected. The shoes 37 of the outer series of valves 11 follow the grooves 32 and 32^a which intersect and cross

each other at the point 38 so that in one revolution the shoe 37 occupies the inner groove 32 and in the next revolution, the outer groove 32^a. In like manner the grooves 33 and 33^a intersect and cross at the point 39 resulting in the same operation on the shoes of the inner set of valves 13. It will thus be seen that each cylinder is provided with a valve in the outer head thereof and a valve controlling the inner head thereof and that each of said valves forms alternately an inlet and an exhaust valve. These valves are opened and closed by the cam plate 31' in connection with the operating devices hereinabove described so that the charges of gas are properly timed and admitted to each cylinder first at one side of the piston and then at the opposite side thereof and compressed and exploded in the usual manner. Two sets of inlet and exhaust chambers 22 and 23 are employed as shown in Figs. 1 and 2, one set arranged one-eighth of a revolution in advance of the other, as indicated. As there are four cylinders, this arrangement provides one inlet and one exhaust chamber for each pair of oppositely located cylinders.

From the foregoing description it will now be understood that the greater part of the engine revolves and therefore acts as a fly-wheel, producing an even torque and absence of vibration, the only stationary parts of the engine being the crank shaft, the intake and exhaust chambers and the cam plate. Maximum power is obtained by producing the two explosions in each cycle of operation and adding thereto the impulse obtained from the reaction of the exhaust gases. This particularly adapts the engine for use in all kinds of air craft, automobiles and other light machines.

What I claim is:—

1. An internal combustion engine embodying a stationary crank shaft, a circular series of rotating cylinders, a rotary crank case supporting the inner ends of said cylinders and provided with inclosed intake and exhaust passages, a circular rim connecting the outer ends of said cylinders and provided with intake and exhaust ports, pistons in said cylinders connected with said crank shaft, and arcuate stationary intake and exhaust chambers held against the outer face of said rim and adapted to communicate with all of said intake and exhaust passages and ports.
2. An internal combustion engine embodying a stationary crank shaft, a circular series of rotating cylinders, a rotary crank case supporting the inner ends of said cylinders and provided with inclosed intake and exhaust passages, a circular rim connecting the outer ends of said cylinders and provided with intake and exhaust ports, some of which communicate with the outer ends of the cylinders and others with the intake

- and exhaust passages of the crank case, pistons in said cylinders connected with said crank shaft, and arcuate stationary intake and exhaust chambers held against the outer face of said rim and adapted to communicate with all of said intake and exhaust passages and ports.
3. An internal combustion engine embodying a stationary crank shaft, a circular series of rotating cylinders, a rotary crank case supporting the inner ends of said cylinders and provided with inclosed intake and exhaust passages, a circular rim connecting the outer ends of said cylinders and provided with intake and exhaust ports, spokes connecting said crank case and rim and provided with gas passages which communicate with the passages in the crank case and ports through the rim, pistons in said cylinders connected with said crank shaft, and arcuate stationary intake and exhaust chambers held against the outer face of said rim and adapted to communicate with all of said intake and exhaust passages and ports.
4. An internal combustion engine embodying a stationary crank shaft, a circular series of rotating cylinders, a rotary crank case supporting the inner ends of said cylinders and provided with inclosed intake and exhaust passages, a circular rim connecting the outer ends of said cylinders and provided with intake and exhaust ports, pistons in said cylinders connected with said crank shaft, and arcuate stationary intake and exhaust chambers yieldingly sustained in contact with the outer face of said rim and adapted to communicate with all of said intake and exhaust passages and ports.
5. An internal combustion engine embodying a stationary crank shaft, a circular series of rotating cylinders, a rotary crank case supporting the inner ends of said cylinders and provided with inclosed intake and exhaust passages, a circular rim connecting the outer ends of said cylinders and provided with intake and exhaust ports, pistons in said cylinders connected with said crank shaft, arcuate stationary intake and exhaust chambers held against the outer face of said rim and adapted to communicate with all of said intake and exhaust passages and ports, and mechanically operated valves controlling the intake and exhaust passage of the crank case and the intake and exhaust ports of the rim.
6. An internal combustion engine embodying a stationary crank shaft, stationary intake and exhaust chambers concentric with said shaft, a circular series of rotating cylinders having intake and exhaust ports which communicate with said intake and exhaust chambers, valves controlling said ports, pistons in said cylinders connected with said crank shaft, a rim connecting the outer heads of the cylinders and supporting said intake and exhaust chambers on its outer face, and springs connecting said intake and exhaust chambers and serving to hold the same in contact with said rim.
- In testimony whereof I affix my signature in presence of two witnesses.
- SIMON S. SUTTON.
- Witnesses:
 PHIL BURNETT,
 G. L. FILLINGIM.