C. J. SHUTTLEWORTH.

ENGINE.

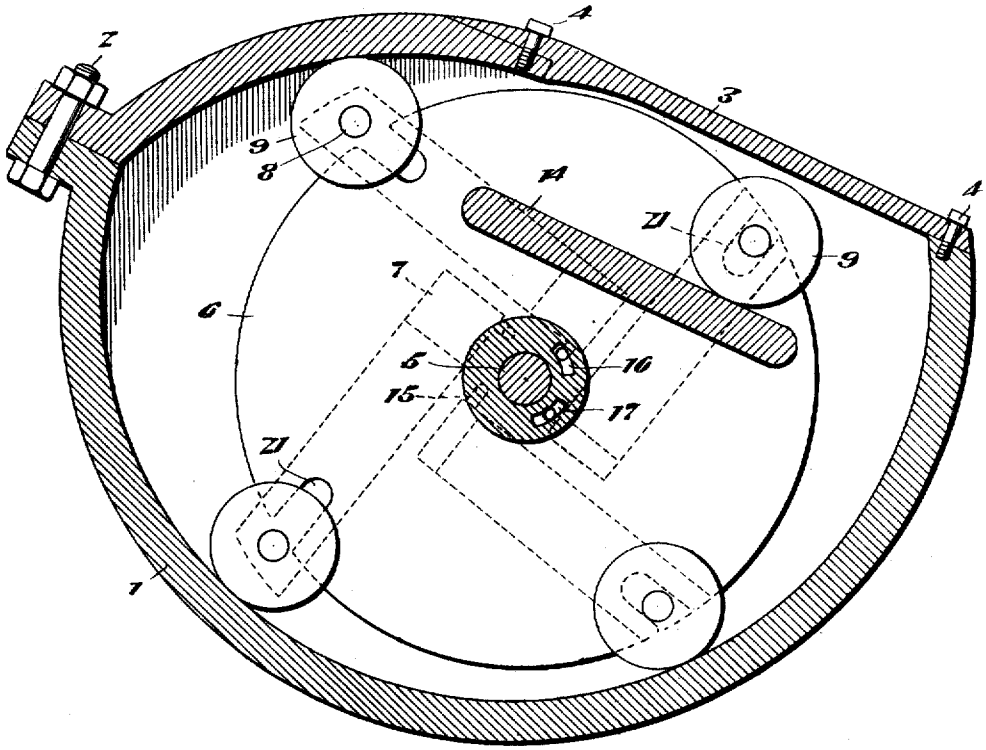
APPLICATION FILED MAR. 16, 1918.

1,308,813.

Patented July 8, 1919.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

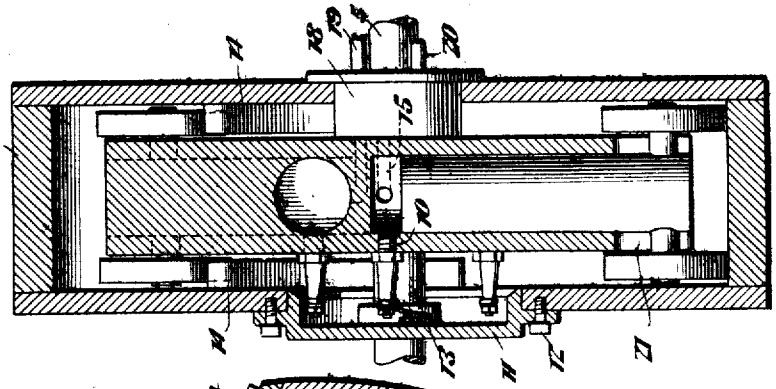
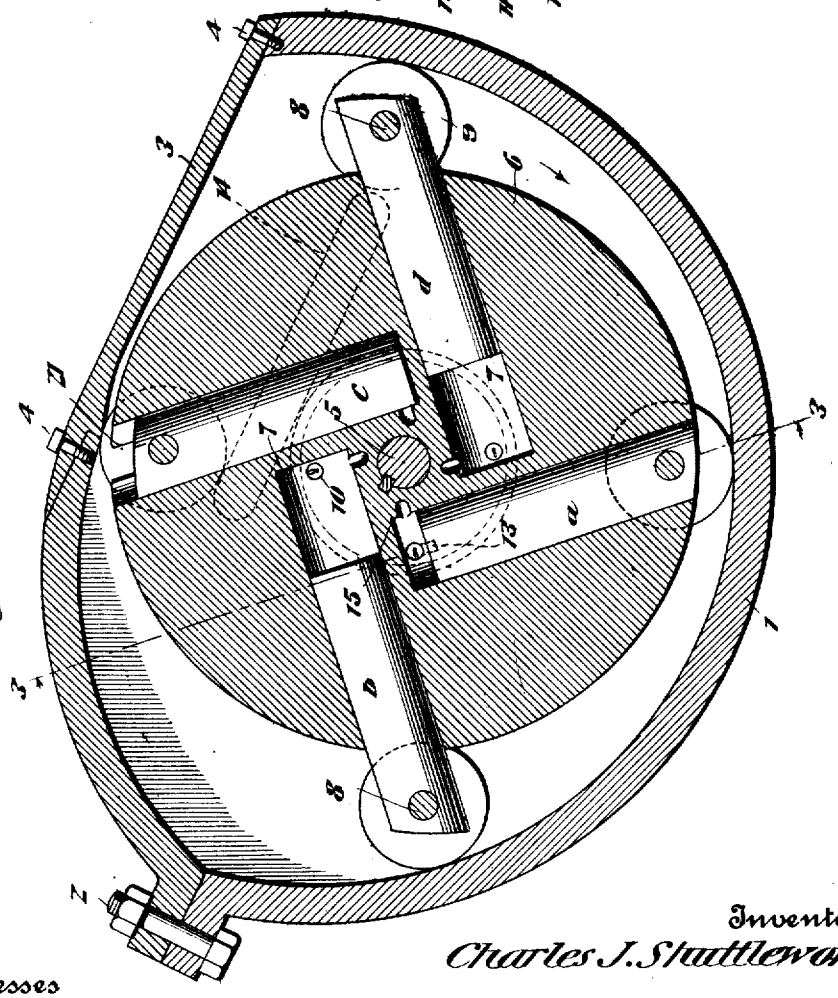


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES J. SHUTTLEWORTH, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO CLARENCE J. WARNICK, OF WASHINGTON, DISTRICT OF COLUMBIA.

ENGINE.

1,308,813. Specification of Letters Patent. Patented July 8, 1919.

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To all whom it may concern:

Be it known that I, CHARLES J. SHUTTLEWORTH, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Engines, of which the following is a specification.

This invention relates to engines of the internal combustion type, the object in view being to produce an internal combustion engine embodying in connection with a stationary casing, a rotor mounted therein and carrying a plurality of pistons which coöperate with the casing in such manner as to cause said pistons to perform their cycles of operation successively.

A further object of the invention is to provide an engine of the general character above referred to in which each piston is operated on its compressing and scavenging strokes by coöperation with the stationary casing in which the rotor works, and in which the rotor is propelled by the outward movement of each piston and the coöperation of the piston during such outward movement with the rotor casing.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts, as herein described, illustrated and claimed.

In the acompanying drawings:

Figure 1 is a vertical longitudinal section through the engine, showing the rotor in elevation.

Fig. 2 is a similar section extending through both the rotor and casing.

Fig. 3 is a vertical transverse section on the line 3—3 of Fig. 2.

The improved engine comprises a stationary or non-rotary casing 1 which is preferably made of sectional formation as illustrated, the sections, of the casing being suitably flanged and secured together by fastening means 2. The casing also comprises a cover plate 3 secured to the main body of the casing by fastening means 4, thus enabling the plate to be removed for the purpose of obtaining access to the pistons carried by the rotor.

Extending through the casing and journaled therein is the engine shaft 5 having mounted fast thereon a cylindrical rotor 6. The rotor is formed with a plurality of combustion chambers 7 of cylindrical formation extending in lines substantially tangential to the shaft 5 as best illustrated in Fig. 2, each combustion chamber being shown as extending at a right angle to the adjacent combustion chambers and across the inner end or head of one adjacent combustion chamber. The rotor casing 1 is of general ellipsoidal shape as shown, the purpose of which will become apparent as the description proceeds.

Each piston carries at its outer end, a wrist pin 8 on the opposite extremities of which are mounted rollers 9 which roll in contact with the inner face of the casing 1. I have shown four pistons *a*, *b*, *c* and *d*, as shown in Fig. 2 of the drawings, the piston *a* is in firing position, being at the initial end of the firing stroke. The piston *b* is approaching the outer limit of its working stroke. The piston *c* is at the inner end of its scavenging stroke, and the piston *d* is starting on its compression stroke. It will be observed that the piston *c* has moved inward to the full extent permitted by the respective combustion chamber, so that practically perfect scavenging of the burned gases is obtained. When the piston is in its firing position, a small firing chamber is left as shown in the combustion chamber occupied by the piston *a*. A spark plug 10 is used for each combustion chamber, being inserted through the side of the rotor immediately adjacent to the inner end or head of the combustion chamber as shown in Fig. 2. The adjacent side or head of the casing is enlarged as indicated at 11 to allow for the movement or sweep of the spark plugs, as shown in Fig. 3, a separate casing section being purposely employed for that purpose and secured to the main casing by fastening means 12. In conjunction with the circular series of spark plugs, I employ a wiping electrical contact 13 which is stationary and with which the spark plugs successively come in contact during the movement of the rotor. The pistons are moved outwardly by means of inclined tracks 14, extending inwardly from the opposite side walls or heads of the casing as shown in Fig. 3, the rollers 9 coöperating with said inclined tracks in a manner indicated in Figs. 1 and 2. Each combustion chamber is intersected by a port 15 which registers with two arcuate ports or passages 16 and 17 for the exhaust and intake, the last named passages or ports 16 and 17 being formed in the inner face of a stationary or non-rotary cylindrical chest 18

which bears against one side of the rotor as shown in Fig. 3, exhaust and intake pipes 19 and 20 leading respectively to said passages 16 and 17. Provision is thus made for introducing the explosive mixture to the combustion chambers and exhausting the burned gases therefrom. Whenever it is necessary to clean the cylindrical chambers 7 and the pistons, this may be easily accomplished by removing the plate 3 and then removing the pistons one at a time by turning the rotor. The pistons may be replaced in the same manner.

Any desired or preferred lubricating system may be employed in connection with the engine hereinabove described. The rotor is formed with slots 21 to admit of the back and forth movements of the pins 8.

It will be observed by reference to the drawings that in each rotation of the engine shaft, there are four impulses or explosions, one in each combustion chamber, thereby practically doubling the power of the engine as compared with the ordinary four-cycle internal combustion engine having the same number of cylinders. It will also be seen that the line of force or direction of thrust of each of the pistons is considerably to one side of the center of the engine shaft. This also materially increases the power of the engine. Furthermore, any desired degree of inclination may be given the pistons and combustion chambers, so that the inner ends of the combustion chambers may be nearer to or farther from the center of the engine shaft as may be found desirable. The engine may be operated with steam as well as an explosive mixture and in fact, may be operated by any explosive fluid.

I claim:—

In a four cycle internal combustion engine, the combination of a rotor having combustion chambers extending from the periphery thereof inwardly in a direction substantially tangential to the center of the rotor, a rotor shaft, pistons mounted for reciprocatory movement in said combustion chambers, rollers at the outer ends of said pistons, and a casing in which said rotor is mounted and against the inner wall of which said rollers travel, said casing embodying a piston controlling wall which is approximately elliptical for substantially three quarters of its extent and approximately rectilinear for the remainder of its extent, whereby a quick suction stroke, a full scavenging stroke and a long working stroke are obtained.

In testimony whereof I affix my signature.

CHARLES J. SHUTTLEWORTH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."