J. J. WALK.

ROTARY ENGINE.

APPLICATION FILED JULY 23, 1918.

1,292,171.

Patented Jan. 21, 1919.

2 SHEETS—SHEET 1.

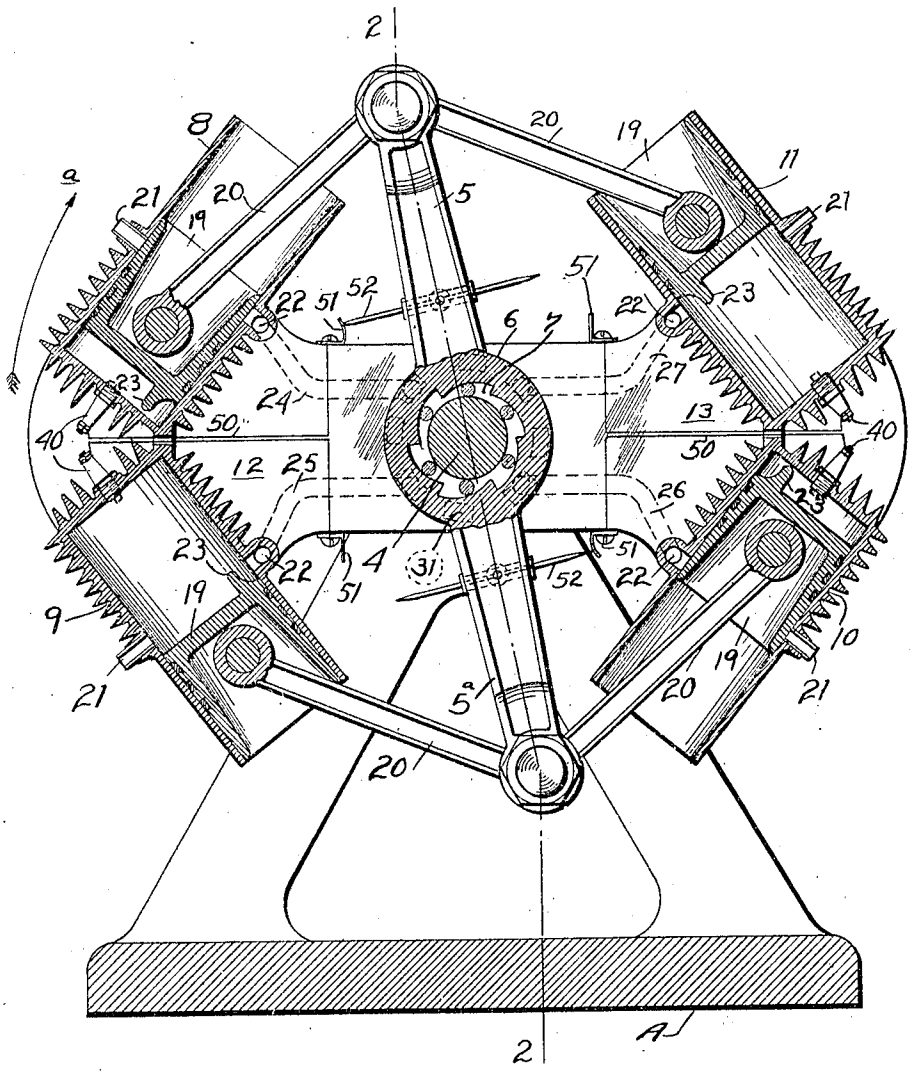


Fig. 1.

Inventor.
Jasper J. Walk.
By Strong & Townsend.
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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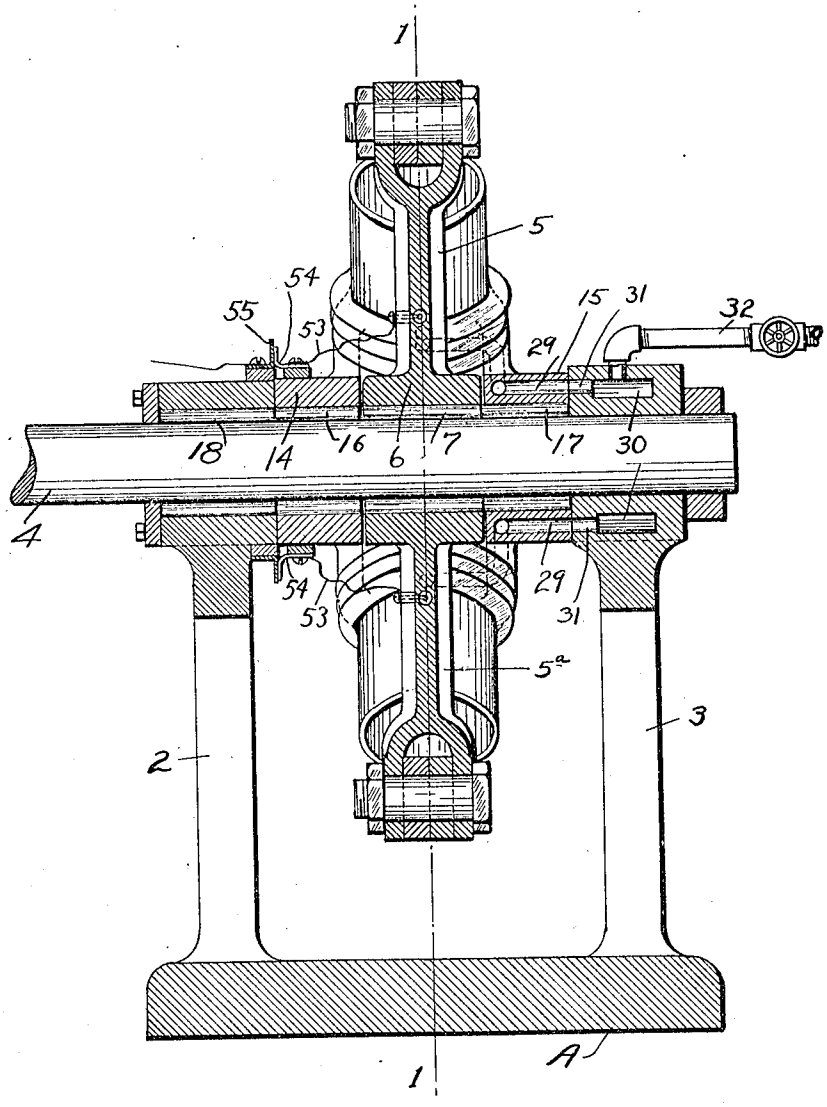


Fig. 2.

Inventor.
Jasper J. Walk.
By Strong & Townsend.
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JASPER J. WALK, OF OAKLAND, CALIFORNIA.

ROTARY ENGINE.

1,292,171. Specification of Letters Patent. Patented Jan. 21, 1919.

Application filed July 23, 1918. Serial No. 246,355.

To all whom it may concern:

Be it known that I, JASPER J. WALK, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to a rotary engine of the internal combustion type.

One of the objects of the present invention is to provide a simple, compact light-weight internal combustion engine of the rotary type in which both the cylinders and shaft revolve, and, which, while adapted to operate on the four-cycle principle, is particularly suited for two-cycle operation.

Another object of the present invention is to provide an engine of the character described, in which the pistons during their entire stroke travel on a line substantially at right angles to the cranks, thus eliminating dead centers and furthermore obtaining a constant maximum leverage during the entire compression and working stroke.

Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings in which—

Figure 1 is a central vertical section on line 1—1, Fig. 2.

Fig. 2 is a cross section on line 2—2, Fig. 1.

Referring to the drawings in detail, A indicates a base member, which, in this instance, is provided with a pair of journal brackets such as shown at 2 and 3. Journaled in the upper ends of said brackets is a shaft 4, and turnably mounted on the shaft is a pair of crank arms 5 and 5ª, which, in this instance, are formed integral with a hub member 6. Interposed between the hub and the shaft 4 is a roller clutch 7, which permits the hub and the crank arms carried thereby to turn freely on the shaft in one direction, while movement in the opposite direction will be prevented; also journaled on the shaft is a plurality of cylinders such as shown at 8, 9, 10 and 11. These cylinders are rigidly secured to radially disposed arms 12 and 13, there being one pair of arms on each side of the crank arms 5 as shown in Fig. 2. The arms 12 and 13 are, in this instance, also carried by hub members such as shown at 14 and 15, and roller clutches are interposed between the shaft 4 and said hub members in a manner similar to that described in connection with hub 6, these roller clutches being illustrated at 16 and 17. The clutches 7, 16 and 17 are all similarly arranged, that is, they will permit the crank arms and the cylinders to turn freely in one direction upon the shaft, but will lock the same against movement in the opposite direction. A roller clutch such as shown at 18 is interposed between the shaft 4 and the bearing carried by the bracket 2. This roller clutch is reversed with relation to the other clutches just described, and therefore locks the shaft 4 against revolving movement in one direction, as will hereinafter be described.

Reciprocally mounted in each cylinder is a piston 19, and connecting each piston with a crank arm is a connecting rod such as shown at 20. Formed in each cylinder is an exhaust port 21, and also formed in each cylinder is an inlet port 22, the exhaust ports being slightly elevated with relation to the intake ports as is usually the case where an engine operates on a two-cycle principle. Similarly each piston is provided with a baffle flange 23, which directs the incoming gases in an upward direction into the respective cylinders. The intake ports of the respective cylinders are, in this instance, each in communication with respective passages 24, 25, 26 and 27. These passages are formed in the arms 12 and 13 on one side of the cylinders, see Fig. 2, and they communicate at one end with the ports 22 and at the opposite ends with passages 29 formed in the hub 15. Formed in the bearing carried by the bracket 3 and surrounding the shaft 4 is an annular passage 30, and communicating with said passage is a plurality of ports 31, which alternately register with the passages 29. The annular passage 30 is connected through a pipe 32 with an air compressor or pressure blower not here shown for the purpose of permitting the introduction of an explosive mixture.

The operation of the engine will be substantially as follows:

With the cylinders and pistons assuming the position shown in Fig. 1 it can be seen that two cylinders are under compression, while the opposite two cylinders have completed their working stroke and are there-

fore in readiness to receive a new charge through the intake ports. This is permitted as the passages 25 and 29 are in direct alinement with corresponding ports 31 and the annular passage 30. An explosive mixture under pressure can thus pass through said ports and passages to the respective cylinders 9 and 11, the opposite cylinders 8 and 10 having received their charges and being under compression are ready for ignition, said ignition being accomplished by providing spark plugs 40, and by automatically closing the circuits therethrough, as will hereinafter be described. Explosion of the mixture in the cylinders 8 and 10 will cause the cylinders to remain stationary, while the crank arms and shaft, together with the connecting rods 20 and pistons 19, will travel in the direction of arrow *a*. Compression will then take place in the cylinders 9 and 11, and exhausting and recharging of the cylinders 8 and 10 will take place the moment the ports are uncovered. Ignition of the mixture in the cylinders 9 and 10 will now drive the several cylinders and shaft in the direction of arrow *a*, due to the fact that the roller clutch 7 will lock the crank arms against reverse movement. The complete forward movement of the cylinders takes place the moment the ports are uncovered, and when the opposite cylinders have reached full compression. Ignition of the mixture in these cylinders will now advance the crank arms and shaft, together with the connecting rods and pistons. It can, therefore, readily be seen that a rotary movement in one direction is obtained, and it may be termed a rotary vibratory movement, as the cylinders and pistons take alternate turns in advancing, one ahead of the other. Neither the cylinders nor the crank arms can rotate in a reverse direction, as the roller clutches 7, 16 and 17 positively prevent such movement. This is also true of shaft 4, as the roller clutch locks the shaft against rotation, but in an opposite direction from that of the cylinders and the crank arms. While it has been stated that the crank arms and the cylinders intermittently advance, it is obvious that this advance takes place during the rotation of all the members, and it can therefore be stated that during the rotation of the cylinders and the crank arms one advances with relation to the other, therefore producing a vibratory movement, while the shaft 4 is continuously revolving in one direction.

The circuit through the spark plugs 40 by which the mixture is ignited is very simple. Each cylinder is provided with a spark plug as shown, and each plug is connected through a wire 50 with a contact member 51. Each crank arm similarly carries a contact member such as shown at 52, there being one disposed on each side of the crank arm. The contact members 51 and 52 move into engagement when the pistons have assumed their innermost position, or they may contact and close the circuit just previous to the time period when the pistons should reach the highest point of compression, this being what we term advancing of the spark. The circuit can readily be traced, and it is understood that the stationary plugs are grounded, and that the contacts 52 are connected through wires 53 with brushes 54, these brushes being carried by the hub 14 and being in constant contact with a ring 55 carried by the bearings secured on bracket 2.

The engine constructed as here shown is exceedingly simple and contains comparatively few parts. Its weight should, therefore, be small compared to the high power produced, and practically any speed desired should be obtained, as all members rotate and reciprocal movement is eliminated. Explosive mixture delivered through the pipe 32 may be formed in any suitable manner, and the pressure required may be regulated to suit the charge required.

I similarly wish it understood that the materials and finish of the several parts of the engine, and the manner of cooling and balancing the same, may be such as the experience and judgment of the manufacturer may dictate.

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

1. A rotary engine comprising a shaft, a pair of connected arms turnably mounted on the shaft, a second pair of connected arms turnably mounted on the shaft, cylinders secured on the outer ends of said last named arms, a piston in each cylinder, a connecting rod connection between each piston and the first named arms and means for admitting a motive fluid to the cylinders and for exhausting the same.

2. A rotary engine comprising a shaft, a pair of connected arms turnably mounted on the shaft, a second pair of connected arms turnably mounted on the shaft, cylinders secured on the outer ends of said last named arms, a piston in each cylinder, a connecting rod connection between each piston and the first named arms, means for admitting a motive fluid to the cylinders and for exhausting the same and means for locking the first and second named arms against rotation about the shaft in one direction.

3. A rotary engine comprising a shaft, an arm centrally journaled and turnable on the shaft, a second arm centrally journaled and turnable on the shaft, cylinders secured on the outer ends of said second named arm, a piston in each cylinder, a connecting rod connection between each piston and the free ends of the first named arm, means for ad-

mitting an explosive mixture to each cylinder, means for igniting said mixture and means for exhausting said mixture.

4. A rotary engine comprising a shaft, an arm centrally journaled and turnable on the shaft, a second arm centrally journaled and turnable on the shaft, cylinders secured on the outer ends of said second named arm, a piston in each cylinder, a connecting rod connection between each piston and the free ends of the first named arm, means for admitting an explosive mixture to each cylinder, means for igniting said mixture and means for exhausting said mixture, a roller clutch interposed between each set of arms and the shaft adapted to lock said arms against rotation about the shaft in one direction, journal members for the shaft and means for locking said shaft against rotation in one direction.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JASPER J. WALK.

Witnesses:
JOHN H. HERRING,
W. W. HEALEY.

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