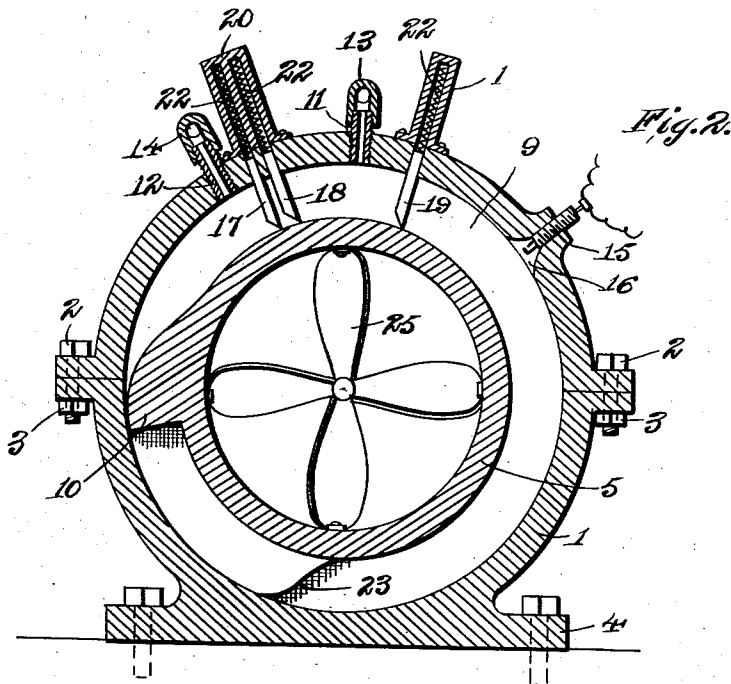
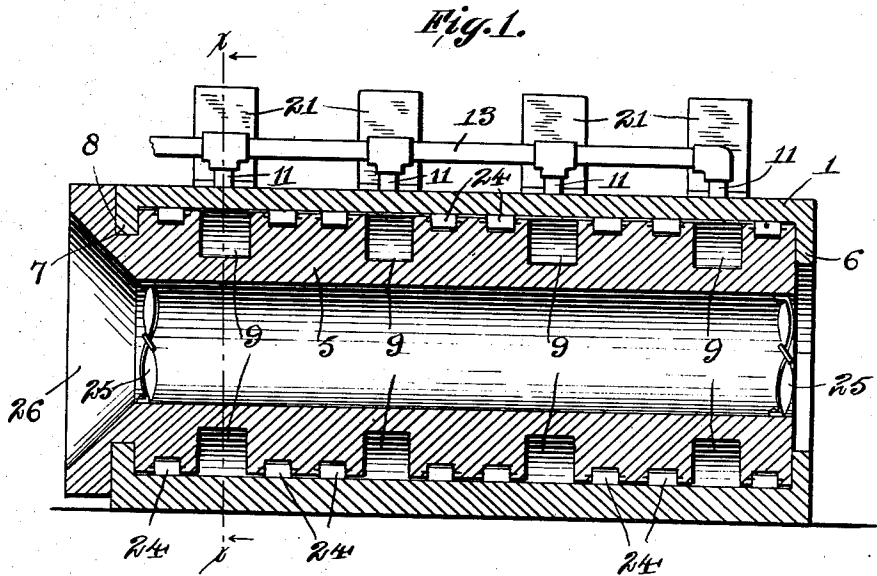


H. D. NEWBURG.
 ROTARY ENGINE.
 APPLICATION FILED SEPT. 21, 1912.

1,065,962.

Patented July 1, 1913.

2 SHEETS—SHEET 1.



Witnesses:
 A. A. Olson.
 B. Y. Richards

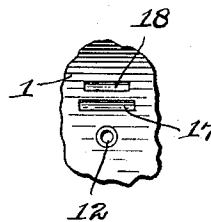
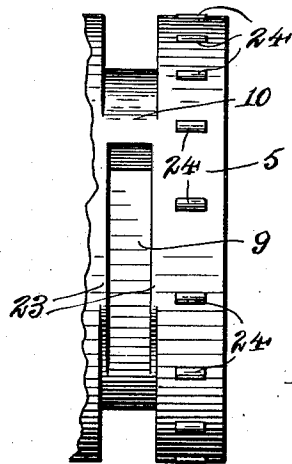
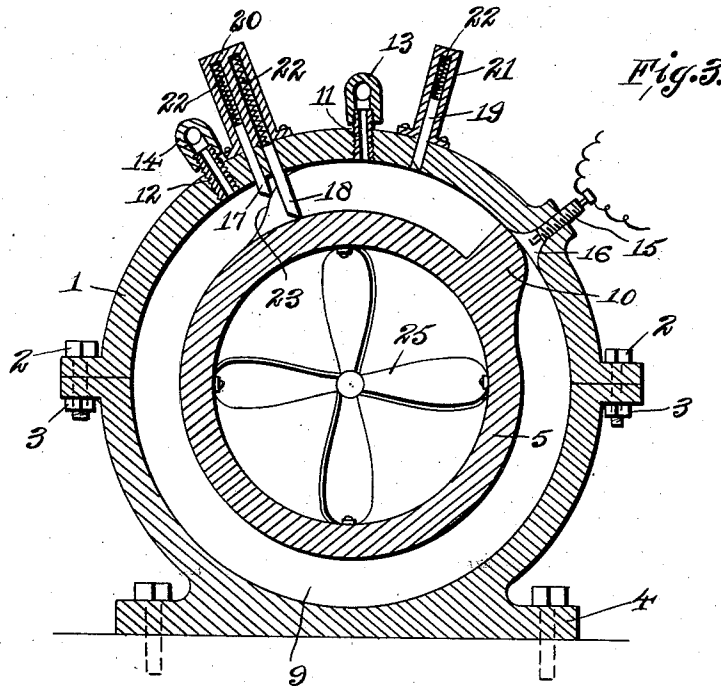
Inventor:
 Henry D. Newburg
 by Joshua A. Torrey
 his Attorney.

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 Henry D. Newburg
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 his Attorney.

UNITED STATES PATENT OFFICE.

HENRY D. NEWBURG, OF LA CROSSE, WISCONSIN.

ROTARY ENGINE.

1,065,962.

Specification of Letters Patent.

Patented July 1, 1913.

Application filed September 21, 1912. Serial No. 721,588.

To all whom it may concern:

Be it known that I, HENRY D. NEWBURG, a citizen of the United States, and a resident of the city of La Crosse, county of La Crosse and State of Wisconsin, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to improvements in rotary engines and has for its object the production of an engine of this character which will be capable of operation through the medium of expanding steam, gas, compressed air or other compressed fluid.

A further object is the production of an engine as mentioned which will be of durable and economical construction and efficient in operation.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter fully described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which—

Figure 1 is a central vertical longitudinal section of a rotary engine embodying my invention, Fig. 2 is an enlarged vertical transverse section taken on line $x-x$ of Fig. 1, Fig. 3 is a view similar to Fig. 2 showing the rotary element in a different position from which the same is shown in Fig. 2, Fig. 4 is a side elevation of a fragment of the rotary element of the engine detached, and Fig. 5 is a fragmentary view of the inner surface of the engine casing in which are mounted slide valves included in the invention.

The preferred form of construction as illustrated in the drawings comprises a tubular cylindrical casing 1 which is formed of two parts, as shown, which are connected by screws 2 and nuts 3, the lower part being provided with a suitable base 4. Rotatably mounted within the casing 1 is a tubular cylindrical rotary element 5, the latter being held against relative longitudinal movement in casing 1 by means of inwardly extending circumferential flanges 6 and 7 formed at the extremities of said casing, flange 6 engaging against one end of element 5, flange 7 engaging a circumferential groove 8 formed in the periphery of said element adjacent the opposite end thereof. Spaced in the periphery of the rotary ele-

ment 5 is a plurality of circumferential grooves 9 in each of which is formed a piston vane 10, as clearly shown in Figs. 2 and 3. The grooves 9, during operation of the engine, constitute annular expansion chambers. Communicating with each of said chambers is an admission pipe 11 through which the explosive charge is admitted and an exhaust pipe 12, said admission pipes 11 being connected by a manifold 13 which leads to a carbureter or other source of explosive mixture supply, the pipes 12 being connected with manifold 14 which opens into the outside atmosphere. Also communicating with each of said chambers is an electric spark plug 15 of conventional construction, which, during operation of the engine, will be so timed as to ignite the charges admitted to the chambers at the proper intervals. The inner ends of spark plugs 15 are positioned in recesses 16 formed upon the inner surface of casing 1 so as to permit of the passage of piston vanes 10.

Coöperating with each of the grooves or chambers 9 are radially movable slide valves 17, 18 and 19, said valves being mounted in radial slots provided in casing 1 and in housings 20 and 21 which are secured to said casing over said slots, as clearly shown in the several views. Coöperating with said valves are helical compression springs 22 which serve to normally hold said valves at their inner terminals of movement or in traversing positions. The valves 17 and 19 are of such a width as to be adapted to fit snugly in the groove engaged thereby, and so that in the operation of the engine shoulders 23, which are formed in the groove adjacent the piston vane 10, will serve to hold said valves in open position for a short period of time after the passage of the piston vane thereby. Said shoulders 23 are formed by simply reducing the width of the groove, as shown in Fig. 4, the extremities of the inner edges of said valves contacting with said shoulders during the operation of the engine, as will be readily understood. Valve 18, however, is narrower than the valves 17 and 19, and so that during rotation of the rotary element 5 the former will move to closing position immediately after the passage of the vane 10, as shown in Fig. 3.

In the operation of the engine the explosive mixture will be drawn into the expansion chambers or grooves 9 by the suction

created through the passage of piston vanes 10 by the admission ports 11. The charges thus drawn into said chambers will follow the piston vanes 10, the valves 19 being held in open positions or at their outer terminals of movement by means of shoulders 23, for a short period after the passage of said piston vanes in order to allow for the passage of a sufficient quantity of explosive mixture to the explosion chambers which will be constituted between the piston vanes 10 and the valves 19 when the latter are moved inwardly. After said valves 19 have been released from shoulders 23 and have moved to their inward positions, the charges will be ignited by igniters 15. The reaction upon the valves 19 and the expansion of the ignited gases will act upon piston vanes 10 to cause rotation of the element 5. Scavenging of the grooves or chambers 9 will take place when piston vanes 10 pass the exhaust pipes 12. Two valves 17 and 18 are interposed between the admission and exhaust ports in order to effectually prevent communication between said ports at all times. With the arrangement disclosed, it will be seen that valve 18 will move to closing position immediately after the passage of piston vane 10 coöperating therewith and valve 17 will move to closing position to effectually traverse the increased width of the groove after the passage of shoulders 23. Thus, with the present construction, a charge will be drawn into each of the grooves or chambers 9, exploded and the spent gases exhausted with each rotation of the rotary element. Through the provision of a plurality or series of grooves or expansion chambers, as described, a powerful torque may be developed.

In order to alleviate friction, bearing rollers 24 may be interposed, as shown, between the contacting surfaces of the casing 1 and rotating element 5, said rollers being preferably mounted in slots provided in the periphery of said rotating element, as shown.

Arranged within the rotating element 5 at either extremity thereof is a fan 25 adapted, when said element is rotated, to create a draft therethrough in order to cool the same. Provided at one end of member 5 is a conical seat 26 adapted to constitute one part of a friction clutch for connecting the engine with any mechanism which it is desired to drive.

A rotary engine of the construction set forth is simple and economical in construction and hence may be manufactured at a low cost, and the same will be found to be highly efficient in use.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I,

therefore, do not wish to be limited to the precise details as set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. An engine of the class described comprising a casing; a rotary element therein having a circumferential groove constituting an expansion chamber; a piston vane on said rotary element arranged in said groove; means for admitting a charge of explosive mixture to said chamber; means of exhaust from said chamber; an igniter, said admission means being arranged between said exhaust means and said igniter; valves mounted in said casing adapted to traverse said chamber and to move outwardly to permit of the passage of said piston vane during rotation of said rotary element, one of said valves being arranged between said admission means and said exhaust means, and one between said admission means and said igniter; and means on said rotary element for holding said last mentioned valve in open position for a short interval after the piston vane has passed the same, substantially as described.

2. An engine of the class described comprising a casing; a rotary element therein having a circumferential groove constituting an expansion chamber; a piston vane on said rotary element arranged in said groove; means for admitting a charge of explosive mixture to said chamber; means of exhaust from said chamber; an igniter, said admission means being arranged between said exhaust means and said igniter; valves mounted in said casing adapted to traverse said chamber and to move outwardly to permit of the passage of said piston vane during rotation of said rotary element, one of said valves being arranged between said admission means and said exhaust means, and one between said admission means and said igniter; and shoulders at the sides of said groove for holding said last mentioned valve in open position for a short interval after the piston vane has passed the same, substantially as described.

3. An engine of the class described comprising a casing; a rotary element mounted in said casing having a circumferential groove in its periphery constituting an expansion chamber; a piston vane on said rotary element traversing said groove; means for admitting a charge of explosive mixture to said chamber; an igniter, said admission means being arranged between said exhaust means and said igniter; valves mounted in said casing adapted to traverse said chamber and be moved outwardly to permit of the passage of said piston vane

during rotation of said rotary element, there being a pair of said valves arranged between said admission means and said exhaust means, and one arranged between said admission means and said igniter; and shoulders at the sides of said groove for holding said last mentioned valve in open position for a short interval after the piston vane has passed the same, one of said pair of valves being likewise affected by said shoulders, the other of said pair of valves being adapted for reception between said shoulders, substantially as described.

4. An engine of the class described comprising a casing; a rotary element therein having a circumferential groove constituting an expansion chamber; a piston vane on said rotary element arranged in said chamber; means for admitting a charge of explosive mixture to said chamber; means of exhaust from said chamber; an igniter; valves operable by the movement of said piston vane interposed between said admission means, said exhaust means, and said igniter; and a conical seat in one end of

said rotary member constituting one part of a friction clutch, substantially as described.

5. An engine of the class described comprising a casing; a rotary element therein having a circumferential groove constituting an expansion chamber; a piston vane on said rotary element arranged in said chamber; means for admitting a charge of explosive mixture to said chamber; means of exhaust from said chamber; an igniter; valves operable by the movement of said piston vane interposed between said admission means, said exhaust means, and said igniter; and roller bearings interposed between the adjacent surfaces of said casing and rotary element, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY D. NEWBURG.

Witnesses:

EUGENE WILKINS,
O. R. SKAAR.