R. ROTHWEILER.

ROTARY COMBUSTION ENGINE.

APPLICATION FILED AUG. 15, 1918.

1,294,834.

Patented Feb. 18, 1919.

2 SHEETS—SHEET 1.

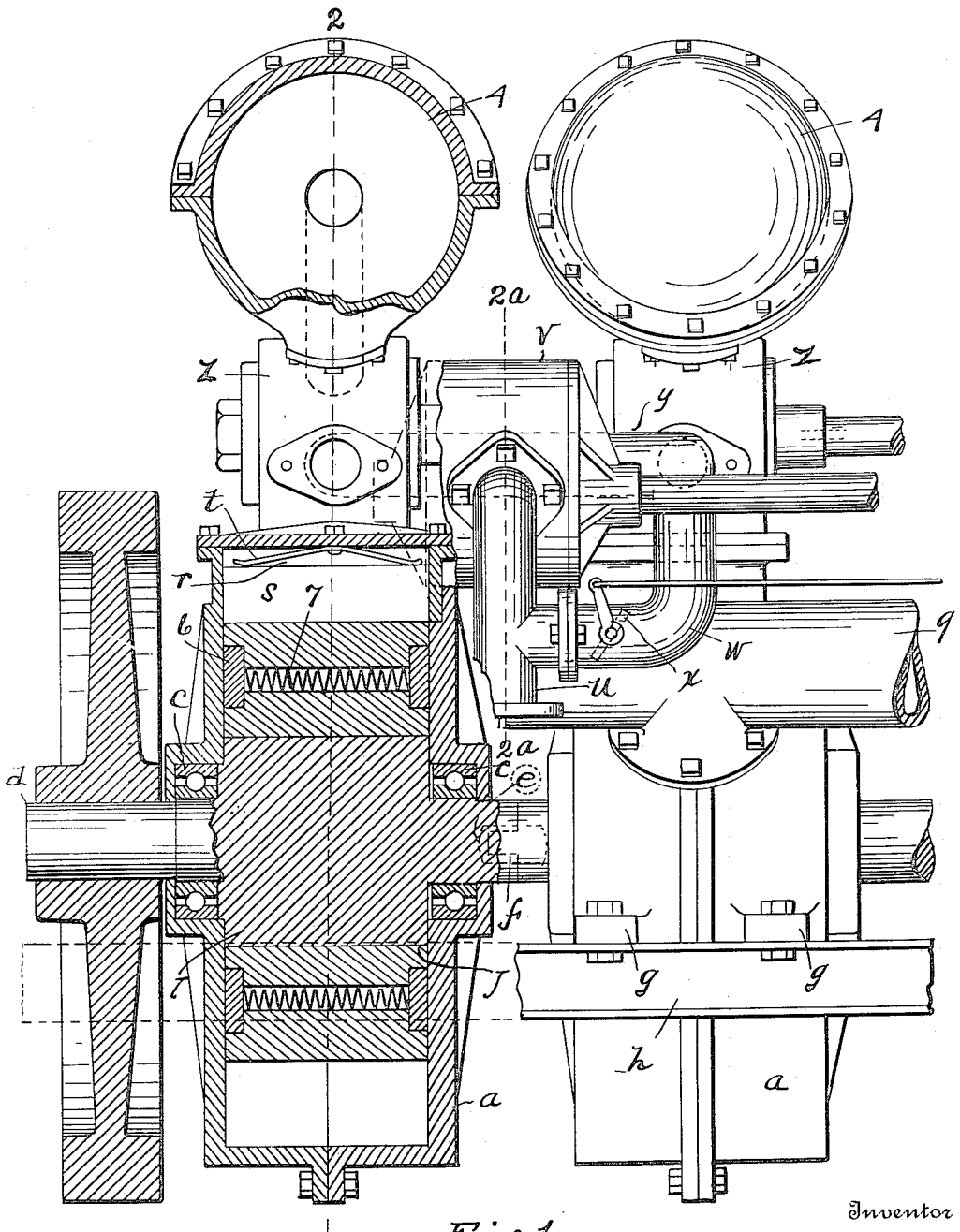


Fig. 1.

Witness

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Inventor

Robert Rothweiler

By Stuart L Barnes

Attorney

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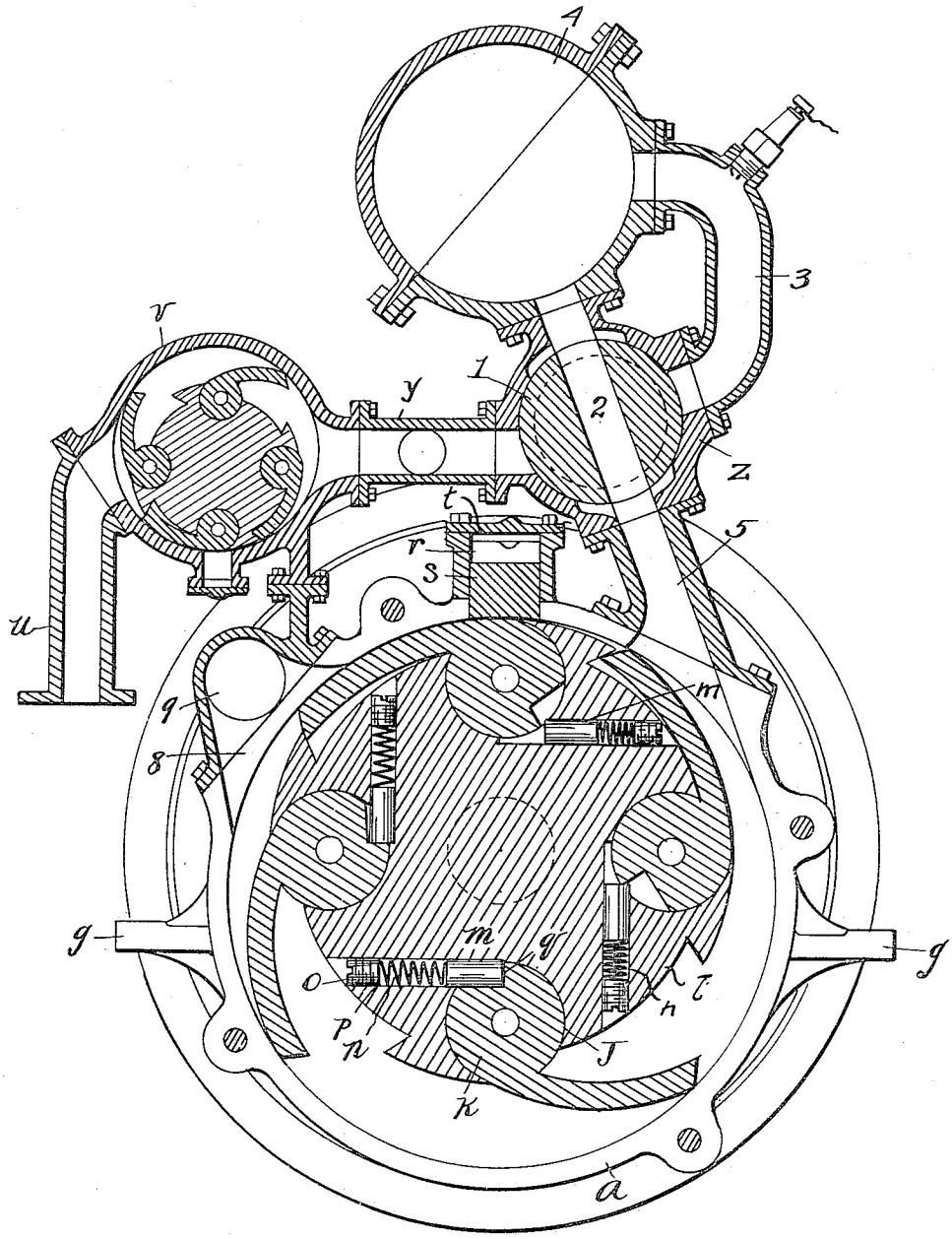


Fig. 2.

Witness

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UNITED STATES PATENT OFFICE.

ROBERT ROTHWEILER, OF MOUNT CLEMENS, MICHIGAN.

ROTARY COMBUSTION-ENGINE.

1,294,834. Specification of Letters Patent. Patented Feb. 18, 1919.

Application filed August 15, 1918. Serial No. 250,001.

To all whom it may concern:

Be it known that I, ROBERT ROTHWEILER, a citizen of the United States, residing at Mount Clemens, county of Macomb, State of Michigan, have invented a new and useful Improvement in Rotary Combustion-Engines, of which the following is a specification.

This invention relates to an internal combustion engine of the rotary type which operates on a quasi-turbine principle.

It comprises a novel arrangement of structure to compress gases, admit them to the combustion chamber and direct them against the blades of the rotor. This structure can be better described after the detail is understood. The rotor is provided with a blade or bucket construction which is simple yet effective to accomplish the purposes in view.

In the drawings,—

Figure 1 is a side elevation partly in section.

Fig. 2 is a cross section taken on the two section lines 2—2 and 2^a—2^a of Fig. 1.

The construction here shown is intended to be air cooled and hence no water jacket is shown for obviously neither the air cooling or water cooling of the parts is necessary to detail as it is merely an engineering problem. The engine is divided up into a plurality of units which may be of any desired number. Each unit comprises a casting *a* which is the stator and which is made up of two halves bolted together. Each of the ends of the cylinder is bossed to provide a socket for the ball bearings *c* that support the rotor shaft *d*. The abutting ends of the rotor shafts *d* have a socket and a projection interlock *f* to bring them into driving relation while a loose alining pin *e* may be fitted into bores in the ends of the shafts. The sides of each stator casting are provided with lugs *g* which may be bolted to the channel frame bar *h*. Hence when each stator is mounted upon the frame the abutting ends of the rotor shafts are interlocked without any other means to keep the two shafts together and fix the stator casting to the frame.

The rotor *i* is eccentrically set in the stator and provided with near-cylindrical sockets *j* in which the cylindrical bases of the buckets or blades turn. The blades are kept normally projected by the action of the plungers *m*, the springs *n* and the abutment screws *o* that fit in the bores *p* and *q* through the rotor and into the cylindrical base of the blades.

The top of the stator is formed into a packing chamber *r* in which slides the packing member *s* acted upon by the bowed spring *t*. This packing member is located at the substantial point of contact between the stator cylinder and the rotor cylinder and with the blades divides the space between the rotor and the stator into a plurality of chambers.

u is an intake pipe from the carburter (not shown). It connects with the rotary compressor *v* which has a rotor and blades built on the same principle as the rotor of the engine. *w* is the by-pass pipe around the compressor with a cut off valve *x*. Hence the gases may or may not be compressed, as desired. *y* is a manifold leading to the intakes of the valve housings *z* and which houses the rotary cylindrical valve 1 provided with the single diametric passage-way 2. This valve housing has two sets of opposed ports. The port opposite the intake port connects with the pipe or elbow 3 that leads to the combustion chamber 4. The combustion chamber is made up of a pair of hemi-spherical castings bolted together. The other set of opposed ports of the valve housing *z* is set at substantially 90 degrees from the first mentioned set and leads respectively into the combustion chamber to which the valve housing is bolted through a suitable flange and into the short pipe-like casting 5 provided with suitable flanges at each end bolted to the valve housing *z* and the stator. This pipe 5 may well be termed the nozzle as it is flared at its mouth to allow the velocity of the gases to increase.

Suitable packing strips 6 are projected against the ends of the stator cylinder from the rotor parts by the springs 7 so as to prevent leakage of the gases between the rotor and the stator walls.

The operation of the engine is as follows: The fuel mixture is taken from the carbureter through the pipe *u* and then into the manifold *y* either through the compressor or the by-pass pipe *w* depending upon whether a compressed charge is desired or not. The

rotary valve 1 is timed so that when the charge is being taken in the passage-way 2 registers with neither sets of ports, and consequently when the by-pass pipe is closed the rotor compresses the gases in the manifold and this compression continues until the valve 1 turns to connect the manifold port and the port leading into the combustion chamber, whereupon the gases escape into the combustion chamber. Upon further turning of the rotary valve the sets of ports are again closed and the charge is fired by sending a current through the spark plug. The valve 1 continues in its rotation and opens up communication between the outgoing port and the combustion chamber and the nozzle 5, allowing the fired gases to escape and expand in the nozzle 5 and expand in the chamber behind the lowermost blade in Fig. 2. This, of course, serves to drive the rotor by virtue of the impulse against the rotor and also expansion of the gases. The burned gases discharge through the exhaust 8 leading to the exhaust manifold 9.

From the above description it will be understood that any number of units may be set along the frame and connected by simply fitting the ends of the rotor shaft into alinement and into driving connection. A single shaft, in convenient driving relation to the rotor shaft, drives the simple rotary valves that operate to close the compression chamber to admit the gases to the combustion chamber and allow the discharge of the exploded gases into the stator.

What I claim is:

1. In a rotary internal combustion engine, the combination of a stator, a combustion chamber adjacent such stator provided with intake and eduction ports, a valve housing between the combustion chamber and the stator, a pipe leading from the valve housing and into said intake port of the combustion chamber, and a single valve which controls the passage-way through said pipe and the passage-way from the eduction port of the combustion chamber into the stator.

2. A rotary internal combustion engine, comprising a stator, a combustion chamber adjacent the stator, housing members forming a passage-way from the combustion chamber into the stator, a pipe leading from one of the housing members into the combustion chamber, and a single rotary valve controlling the flow through the said pipe into the combustion chamber and the flow through the passage-way from the combustion chamber into the stator.

3. In a rotary internal combustion engine, the combination of a stator, a combustion chamber, a valve housing having two pairs of opposed ports, a pipe leading from the port of one pair into the combustion chamber, the other pair of ports forming with the passage-way through the valve a passage from the combustion chamber into the stator, and a single rotary valve for controlling the two pairs of ports to control the admission of fuel into the combustion chamber and the discharge of the exploded gases into the stator.

4. In a rotary internal combustion engine, the combination of a stator, a combustion chamber located adjacent thereto, a valve housing provided with pairs of opposed ports, a nozzle between the valve housing and the stator and having a passage-way connecting with a port which is opposite the port leading from the combustion chamber, a pipe leading from the port opposite the intake port of the valve housing and connecting with the combustion chamber, and a rotary valve in said valve housing having a single cross passage-way for controlling both sets of ports.

5. In a rotary internal combustion engine, the combination of a stator, a combustion chamber provided with an inlet and an outlet port and supported adjacent thereto, a valve housing having two pairs of opposed ports, a nozzle supporting the valve housing upon the stator and connecting with the port opposite the port leading from the combustion chamber, an elbow connecting with the port of the valve housing opposite the admission port of said valve housing and leading to the combustion chamber, and a single rotary valve provided with a cross passage-way for controlling the two sets of ports.

6. In a rotary internal combustion engine, the combination of a valve housing, a stator in connection therewith, a combustion chamber in communication with the valve housing and also through the valve housing in communication with the stator, a manifold in communication with the valve housing, a compressor for compressing the gases in the manifold, and a valve for controlling the closure of the manifold and passage-way through the valve housing from the combustion chamber into the stator.

7. In a rotary internal combustion engine, the combination of a stator, a combustion chamber, a valve housing between the combustion chamber and the stator and allowing a passage-way therethrough when the valve is in proper position, a manifold communicating with the valve housing and through the valve housing when the valve is in proper position to the combustion chamber, a compressor for compressing the gases in the manifold, and a single rotary valve for controlling the closure of the manifold and the passage-way into the stator from the combustion chamber.

8. In a rotary machine, the combination

of a stator, a rotor eccentrically set therein and provided in its periphery with near-cylindrical sockets and having bores connecting with the said sockets, blades provided with cylindrical bases having recesses and adapted to turn therein, and springs and plungers with suitable abutments located in the bores for engaging against recesses in the cylindrical bases of the blades to keep them normally projected.

In witness whereof I have hereunto set my hand on the 6th day of August, 1918.

ROBERT ROTHWEILER.