F. P. RAHMEYER.

ROTARY VALVE MOTOR.

APPLICATION FILED MAR. 13, 1919.

1,388,758. Patented Aug. 23, 1921.

FIG. 1.

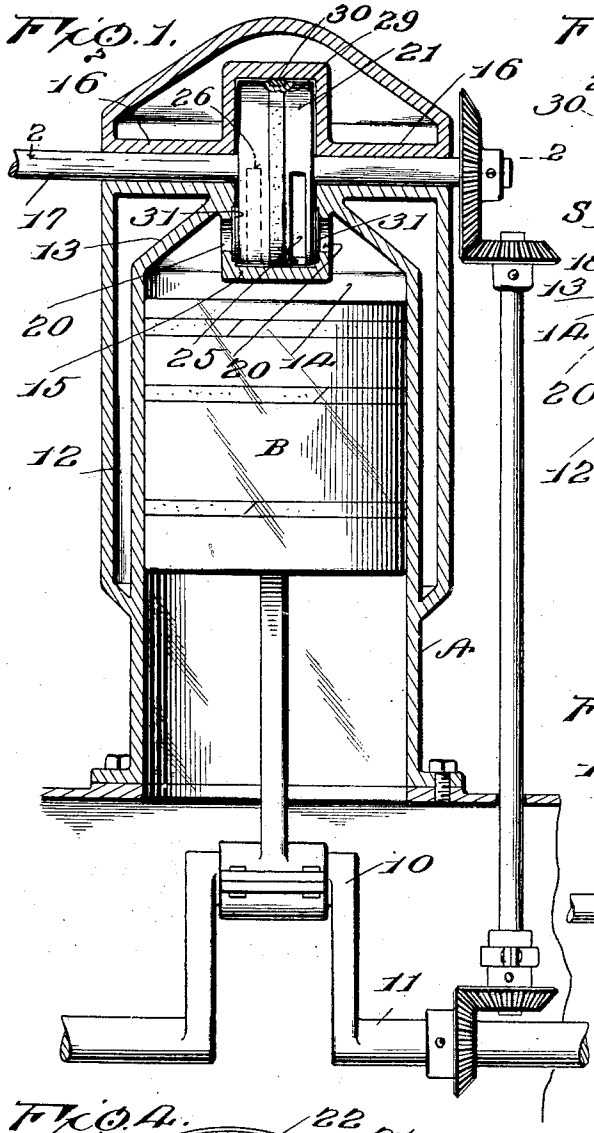


FIG. 3.

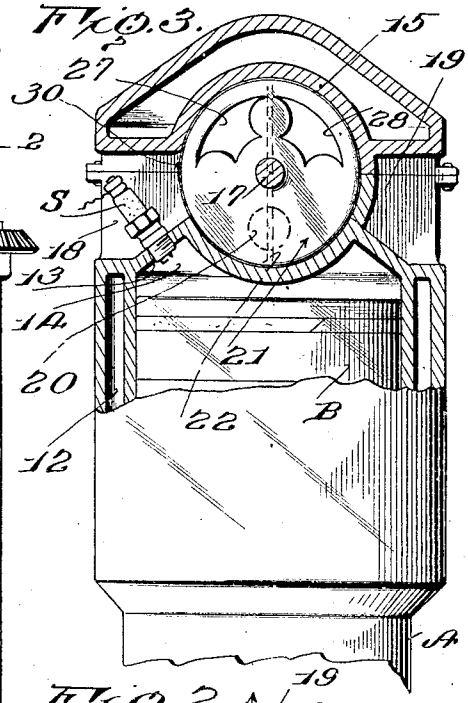


FIG. 2.

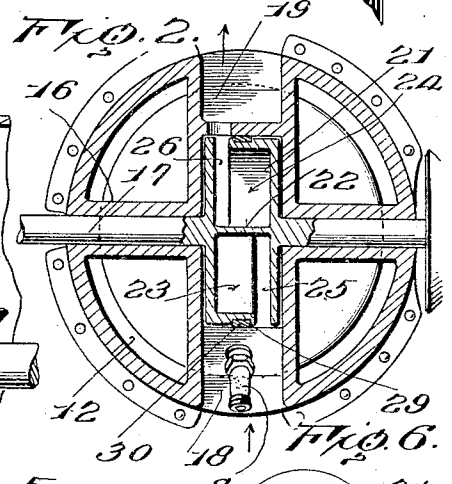


FIG. 4.

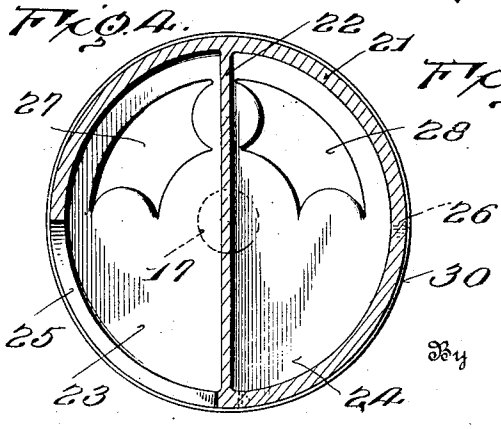


FIG. 5.

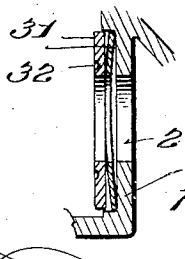
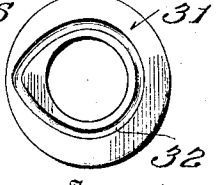


FIG. 6.



Inventor

F. P. Rahmeyer

By Chandlee & Chandlee.

Attorneys.

UNITED STATES PATENT OFFICE.

FRANZ P. RAHMEYER, OF HAMPTON, NEBRASKA.

ROTARY-VALVE MOTOR.

1,388,758. Specification of Letters Patent. Patented Aug. 23, 1921.

Application filed March 13, 1919. Serial No. 282,283.

To all whom it may concern:

Be it known that I, FRANZ P. RAHMEYER, a citizen of United States, residing at Hampton, in the county of Hamilton, State of Nebraska, have invented certain new and useful Improvements in Rotary-Valve Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to valve mechanism for internal combustion engines, and more particularly to the class of rotary valve mechanisms for gas engines of the four cycle type.

The primary object of the invention is, the provision of a valve mechanism of this character wherein the same is balanced and when in operation will be noiseless and will eliminate carbon trouble, it being smooth and easy in operation and will control the intake and exhaust to and from a cylinder or cylinders of the internal combustion engine.

Another object of the invention is, the provision of a valve mechanism of this character which possesses few parts and will be positive and efficient in operation, taking the place of both the intake and outlet valves of an internal combustion engine, for controlling the intake and exhaust thereof to and from the cylinder of the engine.

A further object of the invention is, the provision of a valve mechanism of this character, wherein the possibility of the driving out of fresh gas from the cylinder with the exhaust is eliminated, nor is it possible to take in any exhaust with the fresh gas admitted to the cylinder, the valve being of novel construction and possesses simplicity, durability and is also inexpensive to manufacture and install.

With these and other objects in view, the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter fully described, illustrated in the accompanying drawing and pointed out in the claims hereunto appended.

In the accompanying drawing:

Figure 1, is a fragmentary vertical sectional elevation of an internal combustion engine showing the valve mechanism constructed in accordance with the invention, applied.

Fig. 2, is a sectional view on the line 2—2 of Fig. 1.

Fig. 3, is a vertical sectional elevation taken at right angles to that shown in Fig. 1.

Fig. 4, is a vertical sectional view of the valve employed to control the inlet and exhaust.

Fig. 5 is an enlarged detailed sectional view through the valve casing and packing ring employed in connection with the valve, and

Fig. 6, is a face view of the valve shown in Fig. 5.

Similar reference characters indicate corresponding parts throughout the several views in the drawing.

Referring to the drawing in detail, A, designates generally a portion of one of the cylinders of an internal combustion engine of the four cycle type, and B the reciprocating piston working therein, which is connected with the crank 10 of the crank shaft 11, suitably journaled in the crank casing of the engine, in the usual well known manner, these parts being of the ordinary well known construction, while formed about the cylinder A, is a water jacket 12, as usual, and of any well known construction.

The head 13 of the cylinder A, is preferably conical shaped and likewise the upper end of the jacket 12 is correspondingly shaped thereto and cutting through said head into the combustion chamber 14 in the cylinder A and also within the water jacket 12 centrally thereof, is a cylindrical valve casing 15 from opposite sides of which extend journal housings or boxings 16 forming bearings for a rotatable valve shaft 17, which is suitably geared with the crank shaft 11 for operation to control and actuate a rotary valve, hereinafter fully described.

Opening through the periphery of the valve casing 15 at diametrically opposite points are gas intake and exhaust passages 18 and 19 respectively, while formed in the sides of the valve casing are ports 20, which are opposite each other and are of any desirable shape and so located as to establish communication between the combustion chamber 14 in the cylinder A and the valve chamber 15 for the admission of gas into the combustion chamber and the exhaust thereof after the same has been spent, the intake and exhaust being controlled by the rotary valve hereinafter fully described.

Carried by the valve shaft 17 and located

within the valve casing 15 is a rotary valve whose body is a hollow cylinder or drum 21 having a diametric central partition or web 22 dividing the interior into intake and exhaust compartments 23 and 24 respectively. Formed in the periphery of said body 21 are intake and exhaust slots 25 and 26 which are disposed out of line with each other. These slots extend circumferentially of the drum for about 90° each and are adapted to register with the intake and exhaust passages 18 and 19 successively on the rotation of the valve body 21, the ports 25 and 26 being disposed to open into the compartments 23 and 24, as will be obvious.

Formed in the opposite sides of the body or drum 21 are intake and exhaust openings 27 and 28 respectively, which alternately register with the ports 20 in opposite sides of the valve casing 15 on the rotation of the valve therein, so as to control and regulate the intake and exhaust to and from the combustion chamber 14, in the cylinder A of the engine. These openings 27 and 28 communicate with the respective intake and exhaust compartments 23 and 24 in the valve.

Formed in the periphery of the valve body 21 circumferentially thereof is a packing ring seat or groove 29 in which is engaged a packing ring 30, which works against the inner face of the valve casing 15 to avoid the fresh gas from mixing with the spent or exhaust, and vice versa, in the valve chamber 15.

Disposed concentrically about the openings 20 in the opposite sides of the valve casing 15 and suitably seated therein are compression rings 31 which play against opposite sides of the valve body 21 to form a fluid tight joint or joints therebetween.

Each of the rings 31 has formed in its face next to the valve body 21 an oil groove 32 adapted to receive oil from the valve shaft boxing 16 of the engine for lubricating the valve in the operation thereof, the oil being delivered to the boxing or bearings of the valve shaft from the crank casing of said engine by a force feed oil pump, in any well known manner.

In the operation of the valve, the valve body or drum 21 makes one revolution to two of the crank shaft of the engine which is of the four cycle type and on the beginning of the intake stroke the gas is taken in from the intake passage 18 and admitted to the valve body 21 through the slot 25 into the intake compartment 23, whence the gas is delivered to the combustion cylinder 14 through the opening 27 in the side of the drum and the ports 20 in the valve casing 15 in opposite sides thereof.

During the compression stroke the ports 20 are closed by the valve body 21 and on the exhaust cycle, the exhaust will pass through the ports 20 and the exhaust opening 28 into the exhaust compartment 24, and when the exhaust slot 26 registers with the exhaust passage 19, the exhaust is had therethrough from the combustion chamber 14, in the cylinder A of the engine, and this operation is continuous on the operation of the valve mechanism of the engine.

It is of course to be understood that the openings 27 and 28 are provided in both sides of the cylindrical valve 21, this being particularly shown in Figs. 3 and 4. In Fig. 3 the valve is shown in side elevation and the opposite wall is shown in Fig. 4. Suitable ignition means are provided for the motor and as illustrated, consists of a spark plug S which is mounted in the head 13 in communication with and readily accessible through the intake passage 18, so as to be capable of convenient removal and replacement when it is necessary to clean or repair the same.

The valve mechanism is equally adapted to multiple cycle engines and an explanation is deemed unnecessary, because it is obvious that the valve can be duplicated for use in the multiple cylinder engine.

From the foregoing it is thought that the construction and manner of use of the valve will be clearly understood and therefore a more extensive explanation has been omitted.

What is claimed is:

1. In a rotary valve, the combination with a cylindrical casing having diametrically opposite intake and exhaust passages through its periphery out of line with each other and ports through its sides in alinement with each other; of a valve mounted for rotation within said casing and having a drum-like body containing independent intake and exhaust compartments, and packing around the periphery thereof contacting with the casing, said body having in its periphery intake and exhaust slots on opposite sides of a line through said packing and opening into the respective compartments, and having also through its sides intake and exhaust openings communicating with the respective compartments and adapted to aline with said ports.

2. The combination with a cylinder of an internal combustion engine, and a cylindrical valve casing inset into the head of said cylinder and having ports through its sides communicating with the combustion space thereof and intake and exhaust passages opening through its periphery; of a shaft journaled through the axis of said casing, means for rotating it once for each two complete reciprocations of the piston in said cylinder, and a valve fast on said shaft and having a drum-like body rotating within said casing and internally divided by a diametric partition, said body having on each side of said partition openings through its sides to register with said ports and a slot

through its periphery quartering to its openings to register with one of said passages.

3. The combination with a cylinder of an internal combustion engine, and a cylindrical valve casing inset into the head of said cylinder and having a port through its side communicating with the combustion space thereof and intake and exhaust passages through its periphery; of a drum-like valve rotating within said casing once for each two complete reciprocations of the piston and internally divided by a partition, said valve having on the intake side of its partition a peripheral slot adapted to register with the intake passage and in rear thereof in the direction of rotation an opening in its side adapted to register with said port, and on the other side of said partition a similar opening and beyond the same in the direction of rotation a second slot in its periphery adapted to register with the exhaust passage.

4. The combination with a cylinder of an internal combustion engine, and a cylindrical valve casing inset into the head of said cylinder and having ports through its sides communicating with the combustion space thereof and intake and exhaust passages opening through its periphery; of a shaft journaled through the axis of said casing, means for rotating it for each two complete reciprocations of the piston in said cylinder, and a valve fast on said shaft and having a drum-like body rotating within said casing and internally divided by a diametric partition, said body having on the intake side of its partition a 90° peripheral slot adapted to register with the intake passage and in rear thereof in the direction of rotation a pair of arcuate openings in its sides adapted to register with said ports, and on the other side of said partition a similar pair of arcuate openings and beyond the same in the direction of rotation a second 90° slot in its periphery adapted to register with the exhaust passage.

In testimony whereof, I affix my signature, in the presence of two witnesses.

FRANZ P. RAHMEYER.

Witnesses:
A. L. GAUSMAN,
C. S. DEELHAVER.