J. SHAW.

ROTARY VALVE.

APPLICATION FILED APR. 7, 1910. RENEWED FEB. 9, 1912.

1,066,762.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

Fig. 2.

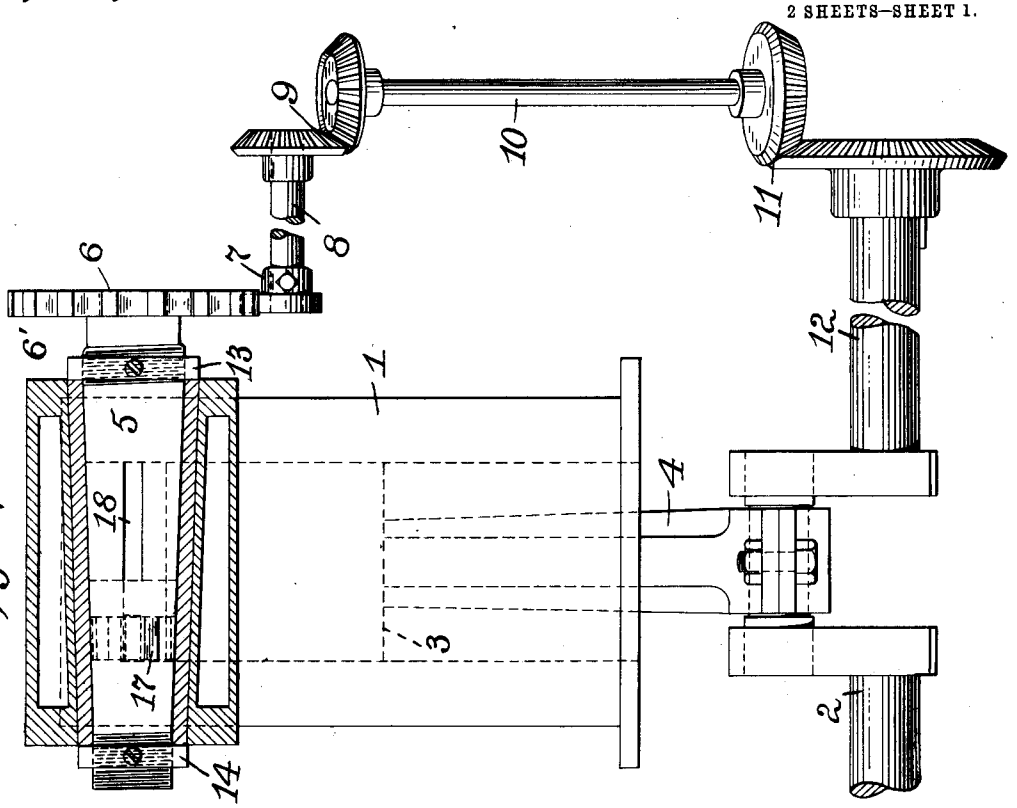
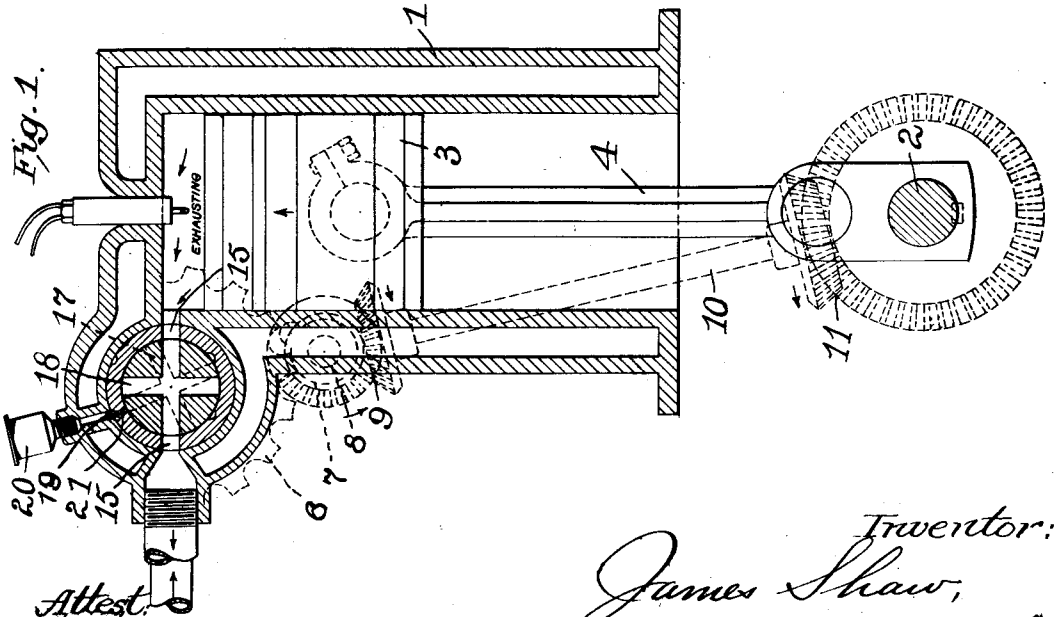


Fig. 1.



Attest:
Edwd. K. Tolson.
Bent. M. Stahl.

Inventor:
James Shaw,
by Spear, Middleton, Donaldson & Spear
Atty's.

J. SHAW.

ROTARY VALVE.

APPLICATION FILED APR. 7, 1910. RENEWED FEB. 9, 1912.

1,066,762. Patented July 8, 1913.

2 SHEETS—SHEET 2.

Fig. 3.

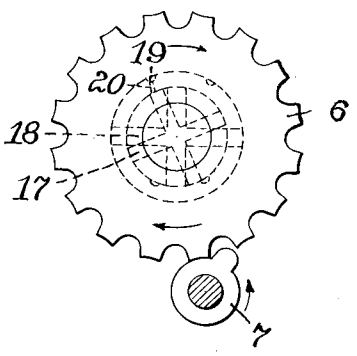


Fig. 4.

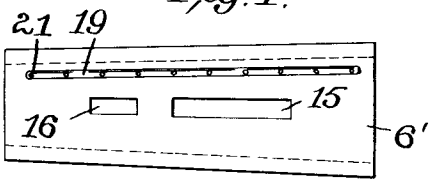


Fig. 5.

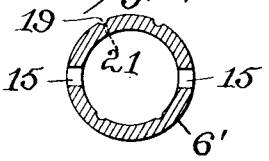


Fig. 6.

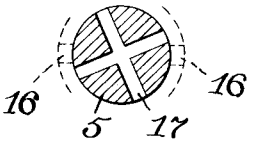


Fig. 7.

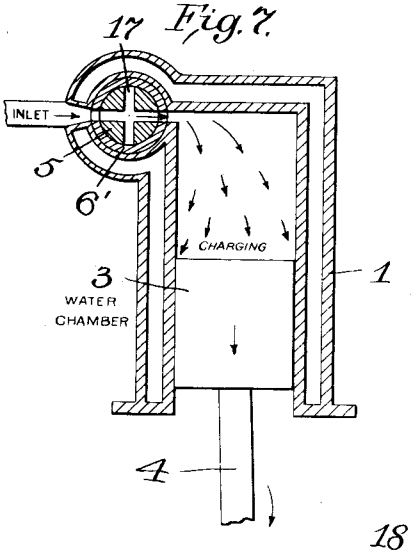


Fig. 8.

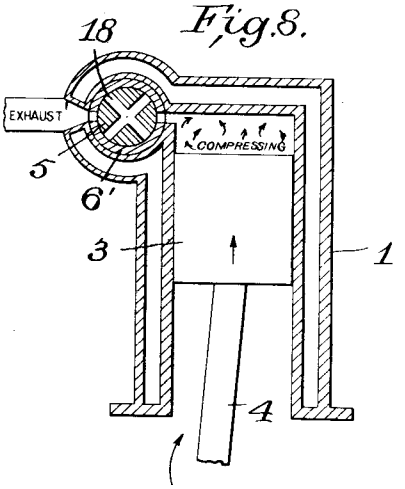
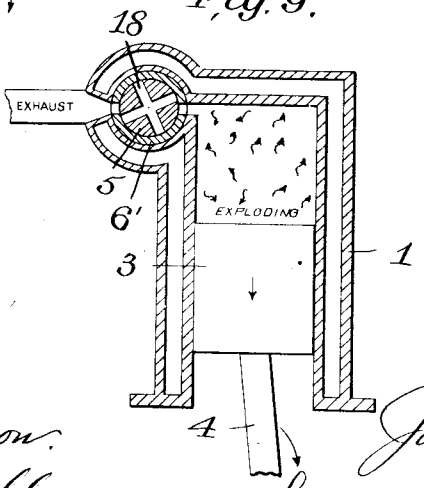


Fig. 9.



Attest:

Edwd. L. Tolson.

Benth. N. Stahl.

Inventor:

James Shaw,

by Spear, Middleton, Donaldson & Spear

Attys.

UNITED STATES PATENT OFFICE.

JAMES SHAW, OF ATCHISON, CALIFORNIA.

ROTARY VALVE.

1,066,762. Specification of Letters Patent. Patented July 8, 1913.

Application filed April 7, 1910, Serial No. 554,048. Renewed February 9, 1912. Serial No. 676,695.

To all whom it may concern:

Be it known that I, JAMES SHAW, citizen of the United States, residing at Atchison, California, have invented certain new and useful Improvements in Rotary Valves, of which the following is a specification.

My invention relates to gas engines, and particularly to valve mechanism therefor for the control of the inlet and exhaust.

In carrying out my invention I aim to provide a valve mechanism which may be positive in its operation, and in which the valve will be moved quickly to its different positions for controlling the ports.

The invention consists in the features of construction and combination and arrangement of parts hereinafter described and particularly set forth in the appended claim.

In the accompanying drawings Figure 1 is a central vertical sectional view through a gas engine embodying my invention; Fig. 2 is a part elevation and part sectional view, said view being of a diagrammatic form; Fig. 3 is a view of the intermediate mechanism for controlling the valve; Figs. 4 and 5 are respectively a side view and a sectional view of a sleeve employed in connection with the valve; Fig. 6 is a sectional view of the valve; Figs. 7, 8 and 9 are views in the nature of diagrams showing the cylinder and different views of the valve in different positions, Fig. 7 showing the inlet portion of the valve and Figs. 8 and 9 the exhaust portion.

In these drawings, the cylinder 1, the crank shaft 2, the piston 3, and piston rod 4 are of any ordinary form. The valve for controlling the inlet and exhaust gases is in the form of a tapered plug 5 connected with means for rotating the same consisting of the toothed wheel 6 and the pin wheel 7, the first mentioned wheel being directly on the axle or shaft of the valve, and the last mentioned wheel being on a shaft 8 connected by gearing 9 with a shaft 10, which shaft is connected through gearing at 11 with an extension of the crank shaft 12. I do not limit myself to the arrangement of these shafts and gears shown in their relation to the cylinder, the view, Fig. 2, being in the nature of a diagram. The valve 5 rotates within a sleeve 6 held in the frame of the engine, nuts 13 and 14 on the threaded portions of the rotary valve being employed to hold the parts in proper relation. The sleeve at its diametrically opposite points is perforated with elongated exhaust ports 15 and inlet ports 16, there being one of these at each side of the sleeve diametrically in line with each other, and these ports are also in line with each other longitudinally. The ports 15 and 16 aline respectively with the inlet and exhaust ports of the valve casing. The valve 5 for controlling the inlet and exhaust gases is provided with two sets of ports, one set being the inlet ports 17 shown in dotted lines in Fig. 1, and in full lines in Fig. 7, and the other set 18 being the exhaust ports shown in full lines in Fig. 1 and also in Figs. 8 and 9. These two sets of ports are disposed at different points along the length of the valve, and each is of four-way character. The angular relation of the two sets of ports is indicated in Figs. 1 and 3, from which it will be seen that the exhaust ports are displaced circumferentially of the valve one step in relation to the inlet ports, and by one step is meant the arc through which the toothed wheel 6 turns at each complete revolution of the member 7 or half revolution of the shaft 2. It will be observed from Fig. 3 that the exhaust port is axially in line with one of the spaces or notches between the teeth of the wheel; the adjacent inlet port is axially in line with the next notch in said wheel. Then there is a blank space or imperforate space or portion of the valve axially in line with two of the notches of the wheel, the next exhaust port being in line with the next notch, and so on throughout the whole circumference of the valve. The gearing at 11 is of two-to-one character, and at each half revolution of the shaft 12 the rotary valve will be turned one step.

In the position of the parts shown in Fig. 1, the exhaust has just taken place through the exhaust ports of the valve and sleeve, and the inlet port is now opposite the imperforate wall of the valve sleeve, whereupon, as the outward stroke of the piston begins, the valve will be rotated one step, to throw the exhaust port opposite the imperforate part of the sleeve, and the inlet port in the valve will be made to register with the inlet port through the sleeve, to allow the charge of fresh mixture to enter the cylinder, as shown in Fig. 7. When this charging action has been accomplished and the piston begins to return, the valve will be given another forward step movement to

throw the inlet valve opposite the imperforate wall of the sleeve, and to present the blank or imperforate surface of the valve opposite the inlet port, and at the same time, as will be noticed in Fig. 8, the exhaust ports in the valve are out of line with the exhaust ports in the sleeve. Compression will now take place, the charge will be fired, and the valve will be given another forward step movement, but this will not be sufficient to carry the imperforate or blank surface of the valve past the port in the sleeve, and, consequently, the valve will remain closed. As the piston completes its working outward stroke, and the exhaust is to take place, the valve is given another forward step movement, bringing its exhaust opposite the exhaust port in the sleeve, and bringing the inlet port in the valve in position to register with the inlet port in the sleeve at the next action, so that after the piston completes its exhaust stroke and empties the cylinder of the foul mixture, the next step of the valve will bring the inlet port into register for the introduction of a fresh charge, and this cycle is then repeated. It will be seen that with my invention the valve is quickly moved from one position to another instead of, as in ordinary practice, by a cam which effects a gradual opening and closing of the valve, and it will be observed also that the valve, when operated, will be quickly and accurately arrested by the engagement of the pin and socket wheels, and thus a positive action of the valve will be secured. The valve sleeve is provided with one or more channels, one of which is shown at 19, extending longitudinally of the outer side thereof, to which oil may be fed in any suitable manner, as by an oil cup 20, and this oil will then be directed to the exterior of the valve through the ports or openings 21, a series of which is formed at the bottom of the channel 19.

I claim as my invention:—

In a rotary valve for a combustion engine, a valve casing carried by the engine, a tapering sleeve held in said valve casing, a solid conical plug valve rotatably fitting within said sleeve, and having two sets of ports, one for the exhaust and one for the inlet, each of said sets of ports comprising two passages extending substantially at right angles to each other, and from side to side of the valve, one set of said ports being displaced circumferentially in relation to the ports of the other set, alined inlet and alined exhaust ports in the said sleeve and valve casing coacting with the inlet and exhaust ports of the valve, means provided in said sleeve for feeding oil longitudinally of the valve and means for giving the valve a step by step forward rotation, substantially as described.

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

JAMES SHAW.

Witnesses:
FRED C. SCHRAM,
GEO. E. SCHRAM.