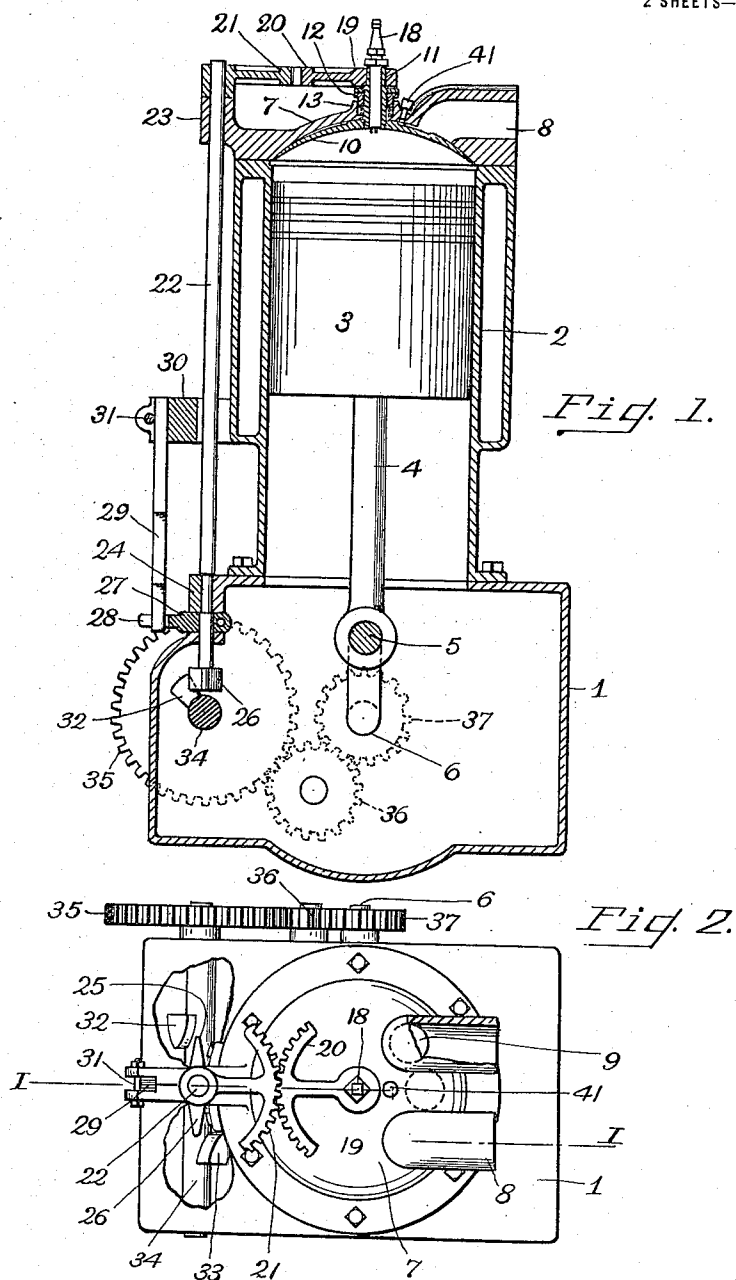


G. L. COBB,
VALVE MECHANISM FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JULY 19, 1915.

1,172,871.

Patented Feb. 22, 1916.

2 SHEETS—SHEET 1.



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Witnesses:

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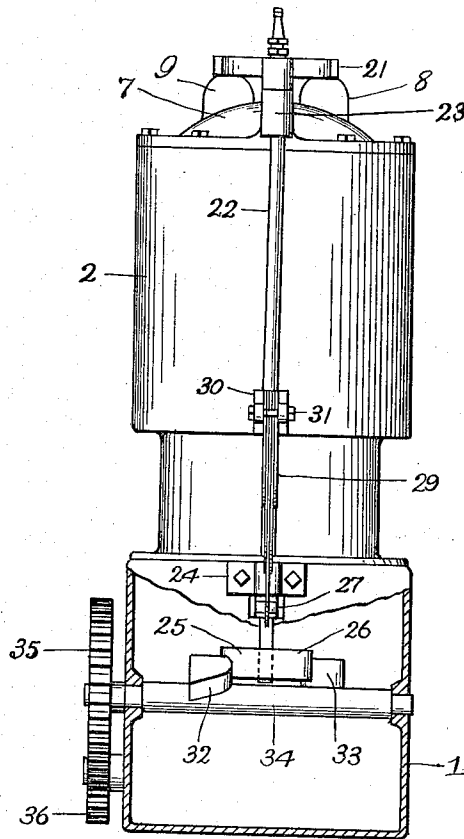


Fig. 3.

Fig. 4.

Fig. 5.

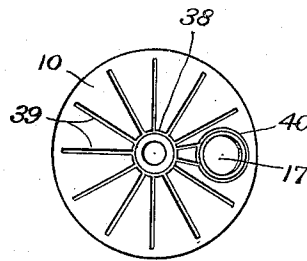
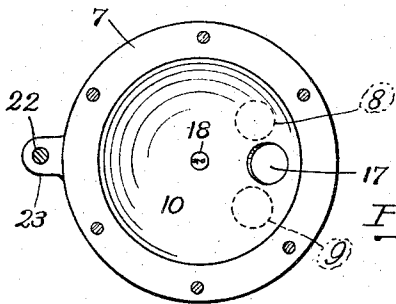
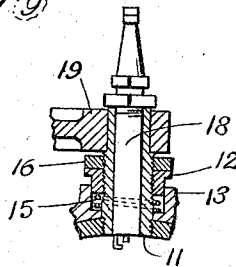


Fig. 6.



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UNITED STATES PATENT OFFICE.

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VALVE MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

1,172,871.

Specification of Letters Patent.

Patented Feb. 22, 1916.

Application filed July 19, 1915. Serial No. 40,671.

To all whom it may concern:

Be it known that I, GEORGE L. COBB, a citizen of the United States, residing at Glade, in the county of Phillips and State of Kansas, have invented certain new and useful Improvements in Valve Mechanism for Internal-Combustion Engines, of which the following is a specification.

My invention relates to valves of internal combustion engines.

The object of the invention is to provide a valve for engines of this type that shall be free of the undesirable features which always develop in engines employing puppet valves for the intake and exhaust.

More specifically, one object of this invention is to provide a valve that will prevent the depositing of carbon between the valve and its seat, which occurs with puppet valves and causes leakage.

Another object is to provide a silently working valve.

Another object is to provide only one valve for both admission and exhaust, thereby reducing the number of parts and the cost of manufacture.

Another object is to provide a valve of such construction that the gas pressure in the cylinder will increase the closeness of the fit between the valve and its seat.

In order that the invention may be fully understood, reference will now be made to the accompanying drawings, in which:

Figure 1 is a vertical sectional view of a four cycle engine provided with my improved valve, the section being made upon line I—I of Fig. 2. Fig. 2 is a plan view of the engine, with portions of the crank case broken out to expose the valve cams. Fig. 3 is an elevation of the engine, the crank case being broken away to show the valve cams. Fig. 4 is a bottom plan view of the valve in position in the cylinder head. Fig. 5 is a top plan view of the valve, removed. Fig. 6 is a sectional detail view of the valve mounting including the tension spring and an ignition plug.

In Fig. 1, 1 designates the crank case; 2, the cylinder; 3, the piston, 4 and 5, the connecting-rod and the crank; 6, the crank shaft.

The cylinder head 7 is provided with an admission port 8 and with an exhaust port 9. The inner face of the cylinder head is concave, and constitutes a seat for my improved valve. Said valve, 10, is shown in

diametrical section in Fig. 1, and in plan by Fig. 5, from which it will be seen that the valve is circular in outline, is made convex on one face to fit accurately its seat in the head 7, and is concave on its lower face. In cross sectional form the valve is gradually reduced in thickness from center to periphery, the latter being brought to a knife edge or nearly so. The valve is thus formed in order that it may be slightly flexible.

The center of the valve is keyed upon the lower end of a vertical rock-shaft 11, which is journaled in the cylinder head 7. A round nut 12 is threaded on shaft 11 and is rotatable in a circular flange 13 cast on cylinder head 7. A spring 15 is under compression by the nut 12, and holds the valve 10 to its seat. Nut 12 is held in adjustment by a jam-nut 16. The shaft 11 is made tubular in order to receive the spark-plug 18, thereby avoiding an opening through the valve as would be necessary if the spark-plug were mounted in the cylinder head.

The valve 10 is provided with a single port 17, which may register with either fixed port 8 or 9. When the valve is at neutral position as shown on Figs. 2 and 4, the valve port 17 is shut off entirely from both of said ports 8 and 9.

Fixedly mounted on the valve shaft 11 above the jam-nut 16 is a hub 19 of a segmental gear 20. Gear 20 is actuated by a segmental gear 21, fixedly mounted on a vertical rock-shaft 22 having one bearing 23 on the cylinder 2 and another bearing 24 on the crank-case 1. Shaft 22 extends down into the crank-case and has keyed thereon a double tappet 25—26. Also secured on shaft 22 is an arm 27 which passes out through a slot in the crank-case and has a bifurcation 28, which receives the lower end of a leaf spring 29, composed of a plurality of leaves which decrease in length from within outwardly, as shown on Fig. 3. The upper end of this compound spring is clamped between a pair of lugs 30 cast on the cylinder 2, by a bolt 31 passing through said lugs. By the spring 29, the rock-shaft 22 is held, normally, at a neutral position, which position corresponds to the neutral position of the gears 20, 21 and of the valve 10.

The tappet arms 25, 26, are actuated by a pair of cams 32 and 33, fixedly mounted upon a rotary shaft 34, journaled in the crank-case 1 and projecting to receive a spur gear wheel 35. Gear wheel 35 is driven

through an idle gear 36, of one half of its diameter, from a gear wheel 37 of the same diameter as the idler 36, keyed on the crank-shaft 6. The cams 32, 33 are so arranged on the shaft 34 that they will actuate the respective tappet arms 25, 26 whereby the vertical shaft 22 will be rocked in opposite directions alternately, whereby the valve port 17 connects the inlet and exhaust ports 8, 9 alternately with the interior of the piston cylinder. The valve cams are so arranged, also, as to properly time the motions of the valve 10 for opening the ports at the proper times in a four-cycle engine. This arrangement of the cams is substantially as shown on Figs. 2 and 3, and the operations within the cylinder are the same as in any four-cycle engine provided with two separate valves for intake and exhaust. After each cam-actuated movement of the vertical rock-shaft 22, said shaft is turned back to normal by the spring 29.

In order that the valve 10 may operate with a minimum of friction, the top of said valve is provided with grooves for holding and conducting lubricating oil, as shown on Fig. 5. Preferably, there is a circular groove 38 at the center, and a number of radial grooves 39 communicating therewith. There is also a circular groove 40 surrounding the port 17 and connected with the central groove 38 by one or more of the radial grooves. Said grooves will hold enough oil in reserve to lubricate the valve for a considerable time. Oil may be supplied to the valve by means of an oil cup 41, mounted as

shown on Fig. 1, or in any preferred manner.

With this form of valve, carbon from the combustion of the fuel will not enter between the valve and its seat, and leakage will be obviated, also the hammering noise caused by puppet valves.

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

1. A valve motion comprising a valve shaft having a valve directly mounted thereon, a rock-shaft, gearing between said shafts, a tappet on the rock-shaft, a cam for actuating said tappet to rock said shaft, a cam shaft, and a spring adapted to actuate the valve reversely after actuation by the cam.

2. In an explosive-engine, a rock-shaft, a valve mounted directly thereon, a gear on said shaft, a port in said valve, a valve seat having inlet and exhaust ports, a second rock-shaft, a gear thereon to actuate the first gear and alternately connect the valve port with the inlet and exhaust ports, a spring for holding all of said elements at a neutral position, and timed means to positively actuate said parts in opposition to the spring, said spring being adapted to return said parts to neutral position.

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

GEORGE L. COBB.

Witnesses:

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G. W. CARTER.

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