H. ESCHWEI.

VALVE MECHANISM FOR ENGINES.

APPLICATION FILED SEPT. 22, 1917.

1,286,967.

Patented Dec. 10, 1918.

3 SHEETS—SHEET 1.

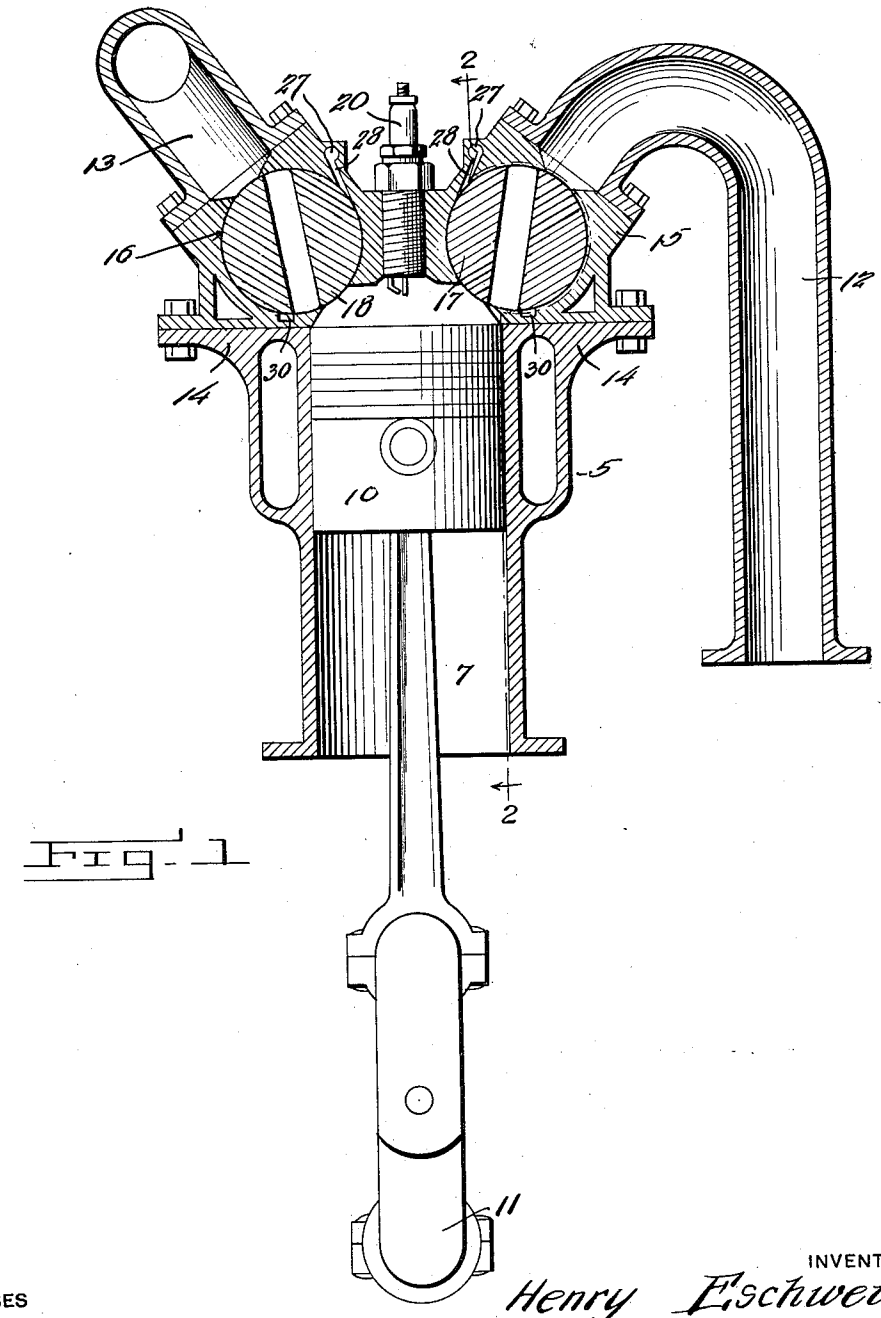


Fig. 1

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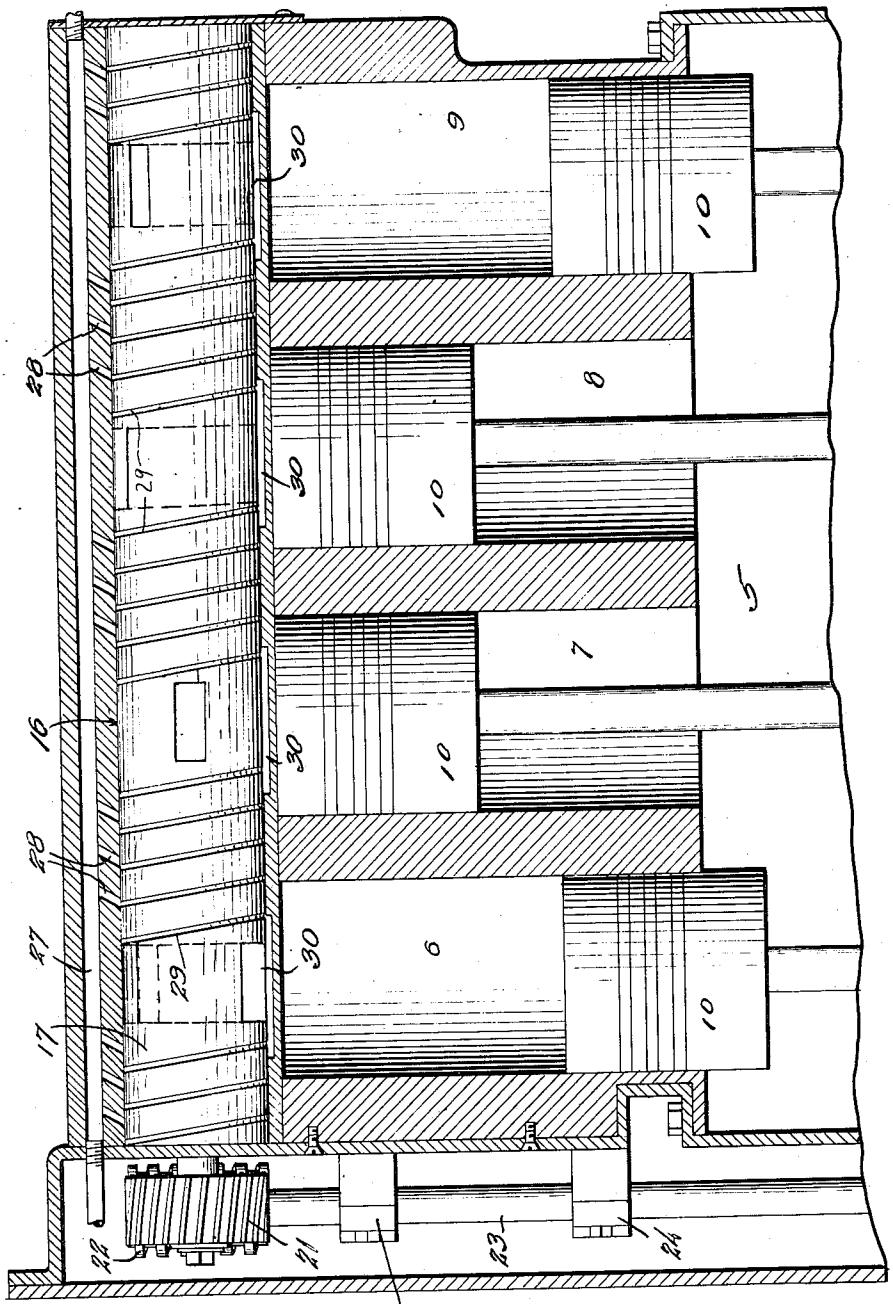


FIG. 2.

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3 SHEETS—SHEET 3.

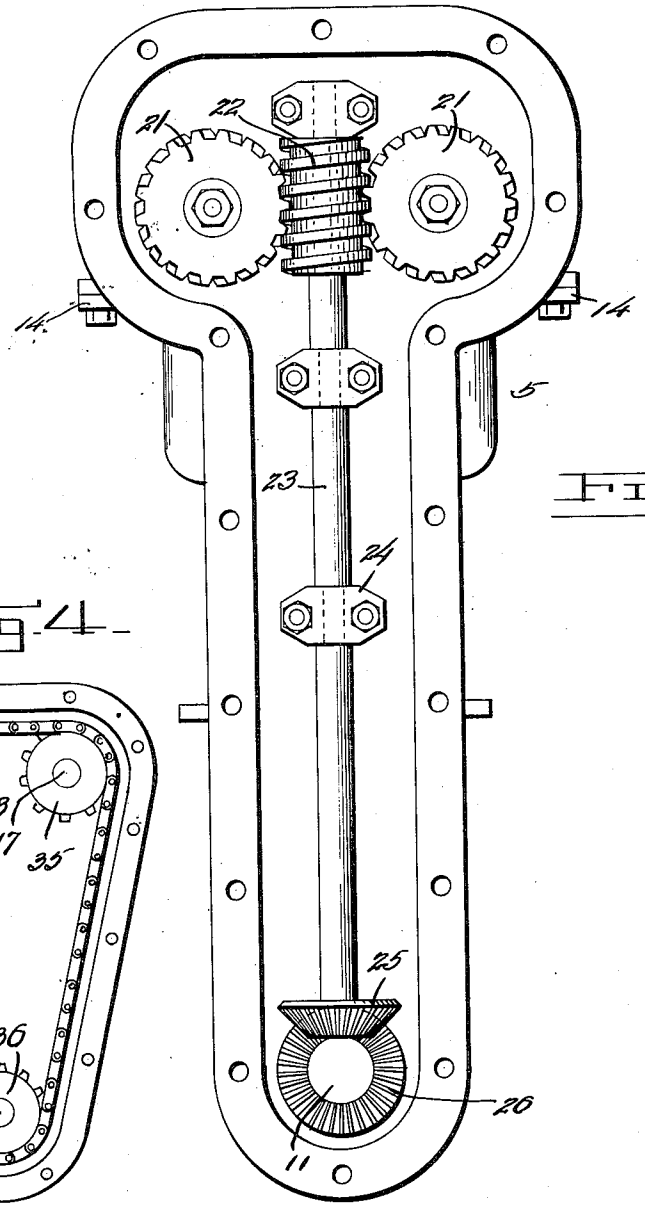
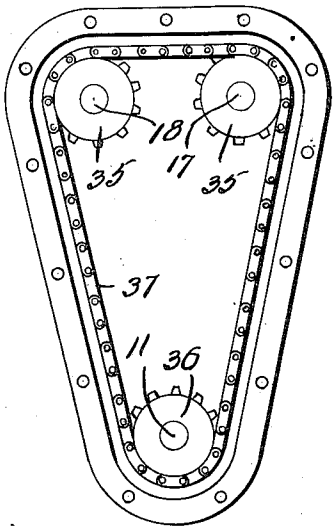


Fig. 5.

Fig. 4.



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VALVE MECHANISM FOR ENGINES.

1,286,967. Specification of Letters Patent. Patented Dec. 10, 1918.

Application filed September 22, 1917. Serial No. 192,740.

To all whom it may concern:

Be it known that I, HENRY ESCHWEI, a citizen of the United States, residing at Sea Cliff, Long Island, in the county of Nassau and State of New York, have invented certain new and useful Improvements in Valve Mechanism for Engines, of which the following is a specification.

This invention relates to valve mechanisms for engines, and is adapted particularly for use with internal combustion engines.

The primary object of the invention is to provide a positively operated valve mechanism for opening and closing the intake and exhaust ports of the cylinders of the engine at the proper times, without the disadvantages, inconvenience and noise incident to the use of puppet valves for this purpose.

A further object of the invention is to provide a removable head for the cylinders of the engine, which head carries the controlling valve and sparking mechanisms, and wherein improved means is employed for operatively connecting the intake and exhaust valves with the crank shaft or other movable part of the engine.

A still further object of the invention is to provide a valve mechanism for use in connection with engines, and wherein a rotatable element is employed, the said rotatable element being equipped with improved lubricating means.

With these objects in view together with others which will appear as the description proceeds, the invention resides in the novel formation, combination and arrangement of parts, all as will be described more fully hereinafter, illustrated in the drawings and particularly pointed out in the claim.

In the drawings:

Figure 1 is a vertical transverse sectional view taken through an internal combustion engine equipped with a valve actuating mechanism constructed in accordance with the invention,

Fig. 2 is a longitudinal sectional view taken substantially upon line 2—2 of Fig. 1,

Fig. 3 is an end view of the engine, and illustrating the means by which the rotary valves are driven from the crank shaft of the engine, and

Fig. 4 is an end view of the engine on a reduced scale, and illustrating a modified form of the invention.

Referring now to the drawings, 5 represents generally the casing of an internal combustion engine which includes the cylinders indicated at 6, 7, 8 and 9, within which the pistons 10 reciprocate, and 11 represents the crank shaft driven by the piston. The intake manifold for the combustion engine is indicated at 12, while the exhaust manifold is indicated at 13.

The upper end of the cylinder casing is provided with outwardly extending horizontally disposed flanges 14, upon which is bolted or in any other preferred manner removably secured a head 15. This head fits snug upon the top of the engine casing, and forms a closure for the upper ends of the cylinders. This head comprises a single casting, and is provided with a pair of spaced parallel longitudinally disposed bores 16, within which the rotatable members 17 and 18 are positioned.

The head is provided with a pair of longitudinally disposed series of spaced ports, the said ports being angularly disposed, and communicate at their inner ends with the various cylinders of the engine. Each of the series of ports has a port communicating with each cylinder, so that each cylinder is provided with a pair of angularly disposed ports, one of which is the intake port, and the other is the exhaust port. These ports are, respectively, in communication with the intake and exhaust manifolds.

The rotatable members 17 and 18 pass diametrically through these ports, and each rotatable member is equipped with a plurality of diametrically disposed apertures or openings, which are adapted to register with the angularly disposed openings in the head 15. The openings in each of the valve members are disposed at different angles, so as to establish communication between their respective cylinder and the intake or exhaust manifold in proper order. It will be observed, particularly with reference to Fig. 1 of the drawings, that when the cylinders are in communication with the intake manifold, the valve in the exhaust port will be closed, and vice versa. A spark plug 20 communicates with each of the various cylinders of the engine, and it will be observed that these spark plugs are carried by the head 15 and are disposed between the longitudinally extending valves thereof.

One end of each of the valve members 17 and 18 has secured thereto a worm-wheel 21, each of which is in mesh with a worm 22, secured at the upper end of a vertically dis-

posed shaft 23, the latter being mounted for rotation in suitable bearing indicated at 24. The lower end of this shaft is equipped with a beveled gear 25, which is in mesh with a similar gear 26 affixed to the crank shaft of the engine.

From this construction it is obvious that as the crank shaft 11 is rotated by impulse of the pistons 10, the rotary valves 17 and 18 will be operated, and the openings therein will be brought in proper turn into register with their respective ports. By reason of the fact that the various openings in the rotary valves are disposed at angles to each other, the various cylinders of the engine will, at their proper times, be in communication with the intake and exhaust ports. The movements of the rotary valves are so timed that after the suction stroke of the piston in each cylinder, the intake will be closed, and this port will remain closed during compression and firing, after which the valve 18 will be moved so that the opening therein will establish communication between the interior of the cylinder and the exhaust manifold. The exhaust valve will remain in open position until after the scavenge stroke has been completed. It will be understood, of course, that the spark plug 20 will be operated by a proper timing apparatus.

Extending longitudinally of the head 15 and adjacent and above each of the bores 16 is an oil passage or channel 27. This passage communicates at one end with the oil pump, and a suitable pipe may communicate with the opposite end of the passage to lead the oil pumped therethrough through a suitable gage (not shown). Each of these passages or channels has communicating therewith downwardly extending ducts 28, the said ducts being in communication at their lower ends with the bores 16 in which the valves rotate. It is obvious, therefore, that the oil contained within the passages will pass downwardly through the ducts 28 to the passages of the rotary valves, and each of these valves is provided with relatively short spiral grooves 29. It will be observed that these grooves are located upon the rotatable valves between the intake or exhaust openings therein. The casting 15 is provided with a plurality of oil recesses or pockets 30, and these pockets communicate with the bores 16 in the casting, and at a point directly below the intake and exhaust openings in the said valves. These pockets are of relatively short duration, and are supplied with lubricant by the spiral grooves 29 in the valves. It is obvious that as the valves rotate, the oil which enters the spiral grooves 29 through the ducts 28 will efficiently lubricate the exterior surfaces of the said valves, and this oil is carried in the grooves and deposited into the pockets 30. These pockets will therefore lubricate those surfaces of the valve which lie between the grooves 29.

In Fig. 4 of the drawings there is illustrated a slightly modified form of the invention, and particularly the means for rotating the valves 17 and 18. In this form of the invention, the worm drive is dispensed with and sprockets 35 are secured on the protruding ends of the rotary valves. The crank shaft 11 is also equipped with a sprocket indicated at 36, and a chain 37 passes over the sprockets 35—36 so that rotary movement of the crank shaft will be imparted to the rotatable valves.

It is obvious from this construction, that I have provided a valve and valve actuating mechanism which is of extremely simple construction and which is positive and reliable in operation. To gain access to the interior of any of the cylinders, the bolts may be removed and the head 15 taken from the cylinder casing. The lubricating system which I have designed will operate efficiently and wearing or heating of the rotatable members will be obviated.

While the present disclosure is that of what is believed to be the preferred embodiment of the invention, it is to be understood that the invention is not limited thereto, but that various changes in the minor details of construction, proportion and arrangement of parts may be resorted to if desired without departing from the spirit of the invention as defined by the appended claim.

What is claimed is:

In an internal combustion engine, a head for the cylinders of said engine, a pair of longitudinally disposed spaced parallel bores in said head, rotatable valve members in said bores, the said valve members having ports for establishing communication between the manifolds and the interior of said cylinders, each of said rotatable members being provided with spiral grooves between said ports, the said head having longitudinally disposed oil channels and ducts leading from said channels to said bores adjacent said spiral grooves said head being cut away at its lower end to provide pockets communicating with said bores and being disposed between the various spiral grooves, and means governed by the movements of the engine for rotating said valve members.

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

HENRY ESCHWEI.

Witnesses:
JOSEPHINE JEANNETTE ESCHWEI,
WILLIAM S. FOWLER.

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