

UNITED STATES PATENT OFFICE.

HERMANN ERNST RICHTER, OF TUCKAHOE, NEW YORK, ASSIGNOR TO CHARLES F. CASSENS, OF YONKERS, NEW YORK.

VALVE MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

1,274,080.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HERMANN ERNST RICHTER, a subject of the Emperor of Germany, and resident of Tuckahoe, county of Westchester, State of New York, have invented certain new and useful Improvements in Valve Mechanism for Internal-Combustion Engines, of which the following is a specification.

This device is a rotating rod valve and has for its particular objects the construction of a valve which extends along the entire series of cylinders regardless of the number and is constructed to rotate in a cylinder in which the valve fits with mechanical closeness.

As the valve is under constant or nearly constant rotation carbon cannot gather to an extent to prevent the valve functioning as required or in any way limit the extent of the intake or exhaust ports.

The valve does not require valve springs, cams, or valve rods and is therefore simpler in construction and operation than the ordinary puppet valve.

With this type of valve it is possible to arrange the intake and exhaust passages in an almost direct line and therefore it is easier to control the intake and exhaust and also possible to completely scavenge the cylinder.

I have endeavored to, as far as possible, modify the construction of my valve and I so constructed the movable valve members so that they may be readily removed or changed or one valve may be substituted for another with but little difficulty.

Another important feature of my device resides in the fact that the cylinder head may be removed exposing to view the entire area of the cylinder and the valve chambers. This is important if repairs are to be made.

The following is what I consider a good means of carrying out this invention and the accompanying drawings should be considered together with the specification which follows:

In the drawings:

Figure 1 is a central vertical section through the cylinder and valves.

Fig. 2 is a side elevation of an engine fitted with my valve, the fracture discloses in section certain of the parts which show the location and operation of the valve.

Fig. 3 shows in elevation a valve rod.

Fig. 4 shows in diagram means of supporting the valve rod bearings and also the water connection thereto.

In general the piston and cylinder, with which each engine is provided, may be of ordinary construction, shape and size and this is also true of the crank shaft, spark plugs and all parts of an engine with the exception of the valve mechanism, I will therefore refer to said parts merely by a reference character, believing that it is not necessary to describe such parts in detail.

At 1, I show a cylinder in which is arranged a reciprocating piston 2. Surrounding the cylinder is a water chamber or jacket 3, and the piston is connected to a crank 4, by means of a piston rod 5, and 6 indicates the crank shaft upon which a number of cranks are provided.

A cylinder head 7, closes the upper end of the cylinder 1, and formed integral in the cylinder and cylinder head are a plurality of valve chambers in which my valves operate and it will be noted that I provide a water chamber 8, extending close to the head of the cylinder and almost entirely surrounding the valves.

The valves are of generally similar construction, shape and size and I provide two valves for each engine or cylinder, an intake valve 9, and an exhaust valve 10.

Each valve is of a length sufficient to extend across the entire series of cylinders and each valve rod 9 or 10 is provided with a plurality of recesses as indicated at 11 and 12. These recesses are cut in the rods and are so shaped that they coincide with the exhaust or intake ports and when in the position as shown by the valve member 10, the exhaust port 13 is connected with the exhaust or outlet 14, but when turned a portion of a revolution in either direction the ports are closed as shown by the intake valve 9 which is closing the intake port 15 and the intake passage 16.

To assure a close and proper fit of the valves I provide a bushing 17 or 18 for each valve and should the valve wear or become loosened it is only necessary to remove the bushing 17 or 18 or both of these bushings and replace them with properly fitted bushings.

As the substituting of the bushings 17—18 may be readily done it will be understood that the valves may be kept running tight

as before a new bushing is placed in position the valve rod may be polished and the bushing may be caused to fit accurately.

To prevent a leak between the ports on a single rod I provide split or expansion rings 19 and 20 between each of the ports and between the last port and the end of the rod.

Upon the valve rod I arrange a driving means such as a sprocket 21, which is, by means of a chain 22, rotated from a smaller sprocket 23 upon the crank shaft 6, this is a simple means of driving the valve rod and should it be necessary or desirable to re-time the valves it will only be necessary to slip the chain one link in either direction, the chain may be a short link chain and in this way more accurate timing may be obtained.

As I prefer to use what is commonly termed the siphon water cooling system, I will provide a passage 24, through the piston head 7, with my type of valve it is possible to have the circulation outlet at the highest point of the cylinder and yet I arrange the spark plug 25, directly into the combustion chamber by offsetting it from the center as shown in Fig. 1.

I call particular attention to the means adopted for cooling the valve rods.

Each rod 9 and 10 is provided with a central perforation or chamber 26—27 extending almost entirely through the rod.

At one end I provide a series of ports 29, and surrounding these ports is a bushing 30, having a passage connected to a water pipe 31, and upon the bushing I provide packings 32 and 33, retained by rings 34 and 35, which prevent the water leaking from the member 30, and insure that it will pass into the interior of the rods 9 and 10.

The water pipe 31 is connected to a pump or other suitable source of supply and at the other end of the valve rod I arrange a tapered cylindrical member 36 which communicates with the passage through the valve rod and it may also be connected to the radiator or water circulating system.

I have found it advantageous to pass water through the valve rods in addition to cooling the rods as previously described, for

as these rods operate adjacent to the combustion chamber and are continuously connected thereto, without the internal cooling as described they would run too hot for mechanical efficiency.

To support the fittings 30 I provide a bracket 37, which may be connected to each of the fittings 35 and 35' secured by means of screws 38 to the engine casing.

I may provide a vertical shaft and bevel gears for driving the valve rods and other modifications may be made within the scope of the appended claims without departing from the principle or sacrificing the advantages of this invention.

Having carefully and fully described my invention what I claim and desire to secure by Letters Patent is:—

1. A valve for engines comprising a plurality of rods each provided with apertures and adapted to control the intake and exhaust ports of said engine, sprockets and chain for continuously rotating said rods, and means surrounding one end of said rods and a tapered plug entering one end of each of said rods for passing a cooling medium through said rods as herein set forth.

2. An engine having a plurality of cylinders, a rod valve extending across all of said cylinders, and beyond each end cylinder said rod being provided with an aperture for each said cylinder and longitudinal perforations, a chamber formed in the cylinder and cylinder head for said rod, means for continuously rotating said rod, means surrounding said rod for introducing a cooling medium to cool the interior of said rod and means entering one end of said rod for receiving said cooling medium after the passage through said rod as and for the purpose set forth.

Signed at New York city, State and county of New York, this 6th day of Jan., 1917.

HERMANN ERNST RICHTER.

Witnesses:

G. E. S. MARR,
ARTHUR PHILIPS MARR.