T. LANE.

INTERNAL COMBUSTION ENGINE.

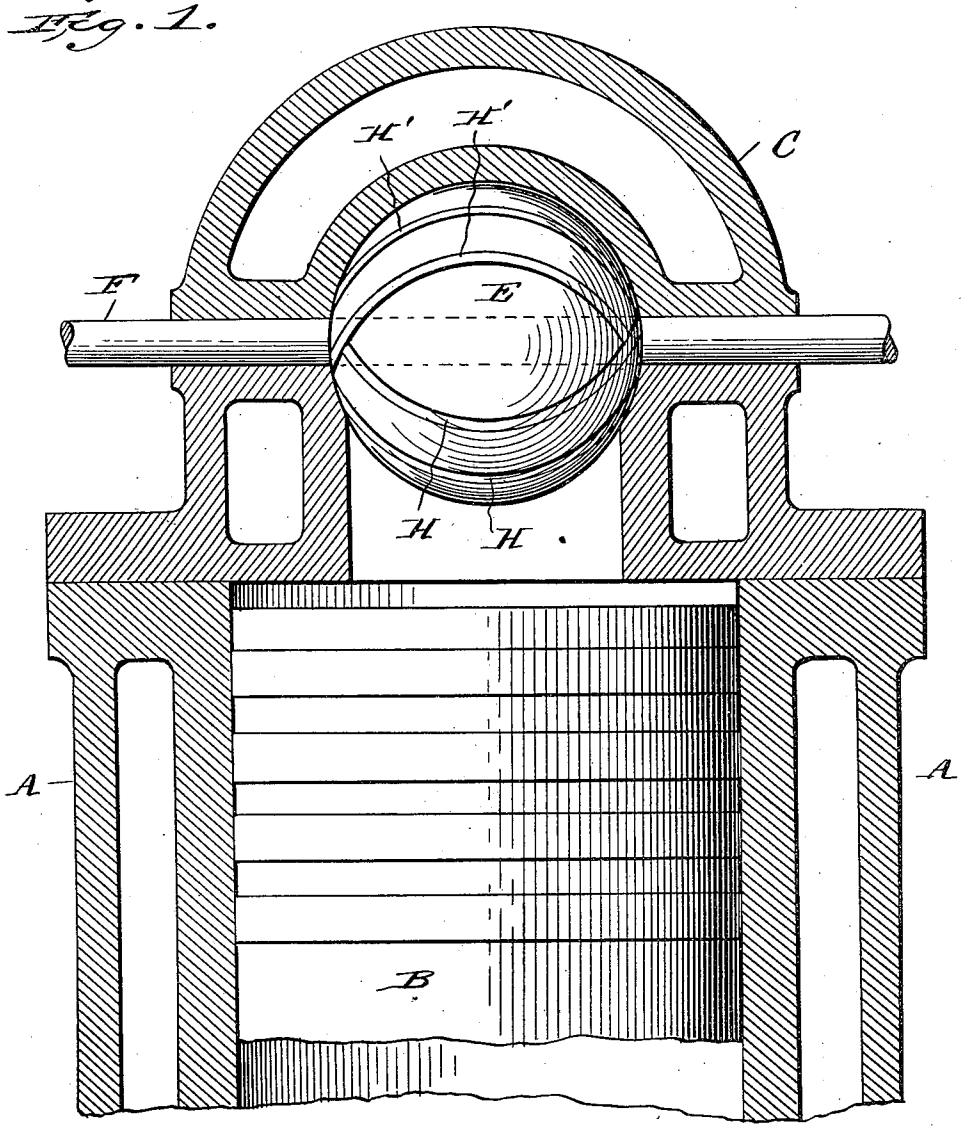
APPLICATION FILED JAN. 4, 1913.

1,087,499.

Patented Feb. 17, 1914.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

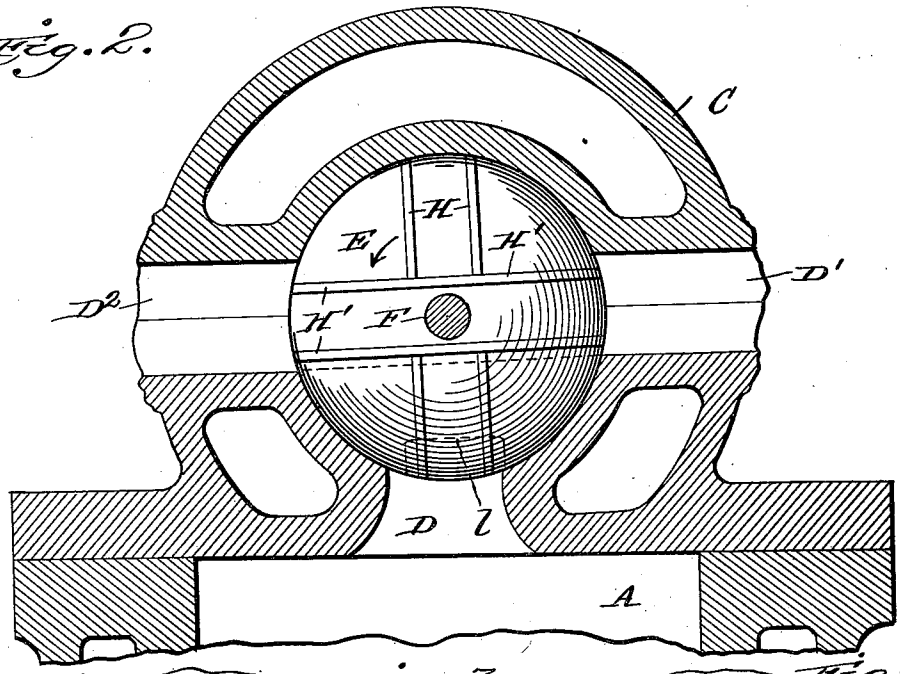


Fig. 3.

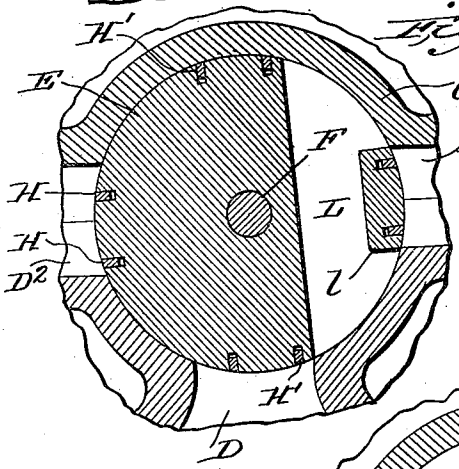


Fig. 4.

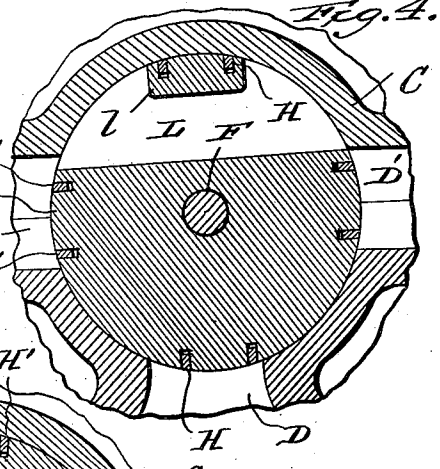
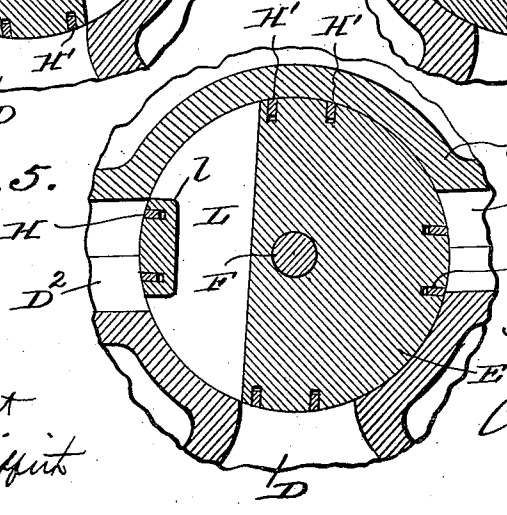


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

THOMAS LANE, OF ATLANTA, GEORGIA.

INTERNAL-COMBUSTION ENGINE.

1,087,499. Specification of Letters Patent. Patented Feb. 17, 1914.

Application filed January 4, 1913. Serial No. 740,214.

To all whom it may concern:

Be it known that I, THOMAS LANE, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Internal-Combustion Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to internal combustion engines, and is particularly applicable to engines of the four-cycle type, the object of the invention being to provide an improved valve mechanism for controlling the admission and exhaust of the gases to and from the cylinder, whereby the construction and operation of the moving parts may be simplified, the efficiency of the engine increased, and the danger of leakage through wear or accumulation of carbon deposit largely obviated.

The invention consists in certain novel details of construction and combinations and arrangements of parts all as will be hereinafter described and pointed out particularly in the appended claims.

Referring to the accompanying drawings, Figure 1 is a section in a vertical plane through the upper portion of a cylinder and the valve chamber of an engine embodying the present improvements, a portion of the piston and the valve being shown in elevation. Fig 2 is a fragmentary section in a plane at right angles to the plane of the section in Fig. 1 and with the valve in elevation. Figs. 3, 4 and 5 are fragmentary sections in the plane of the section of Fig. 2. but with the valve in section and with the ports and passage therein in the positions occupied at the beginning of different strokes of the motor.

Similar letters of reference throughout the several figures indicate the same parts.

In Figs. 1 and 2 the letter A indicates the upper portion of the cylinder of an internal combustion engine which is water-jacketed as usual and adapted to receive a reciprocatory piston indicated at B in Fig. 1. The piston is adapted to be connected with the crank shaft, and the latter to drive the valve mechanism through well known connections, which it has not been deemed necessary to illustrate, inasmuch as these parts do not of themselves form any part of the present invention.

In accordance with the present invention the head C of the cylinder which is water-jacketed as usual is provided with a spherical valve chamber from the bottom of which a single port D communicates with the upper end of the cylinder, while inlet and exhaust ports and passages D′ and D^2, respectively, extend through the wall of the valve chest at diametrically opposite points and are both at angles of ninety degrees from the port D.

A spherical valve E is mounted in the valve chamber and is adapted to be rotated by a valve shaft F, which is driven, as before stated, from the crank shaft, and in the four-cycle motor illustrated the speed of rotation is one-half as fast as the crank shaft itself, any known and suitable form of gearing, such, for example, as sprocket wheels and sprocket chain being employed for the purpose.

The spherical valve referred to is provided with packing rings H, H, and H′, H′, the packing rings H being at right angles to the packing rings H′, and the arrangement being such that each packing ring extends entirely around the valve with the exception of that portion occupied by the intermediate part of the packing rings at right angles thereto. In accomplishing this result it will be noted that the portions of the packing rings at points midway between their ends lie in proximity to the valve shaft F at one side of the valve, while their ends abut against or lie in proximity to the complemental packing rings adjacent the shaft on the opposite side of the valve. With this arrangement the packing rings may be made of the ordinary expansion type and they are so located that at all times one or more of the rings will be in position to prevent leakage between the ports around the valve, and at the same time the rings are caused to sweep over the entire inner surface of the valve chamber, whereby unequal wear is prevented and there is no opportunity for the accumulation of carbon deposit, such as would tend to interfere with the proper operation of the parts.

For controlling the admission and exhaust of the gases the valve is provided with a passage L terminating in two ports lying in the two quadrants on one side of the axis of rotation; in other words, one set of pack-

ing rings, that lettered H, is supported by a bridge *l* which separates the two ports and forms the passage in the valve. The ports forming the terminals of the passage L are displaced approximately ninety degrees in the four-cycle engine illustrated, with which arrangement the operation will be substantially as follows: Assuming that the piston is at the upper end of its travel, substantially as indicated in Fig. 1, ready for the inspiration stroke. When in this position the valve will be in the position indicated in Fig. 2, where the dotted lines show the passage L and its ports. During the downward movement of the piston, the valve travels in the direction indicated by the arrow to the position indicated in Fig. 3, thereby opening communication between the intake port D′ and the upper end of the cylinder. As the piston completes its downward movement the valve reaches the position indicated in Fig. 3, closing the communication between the intake and cylinder and during the compression stroke the valve moves around to the position indicated in Fig. 4, during which time the cylinder port is entirely closed and it remains closed during the explosion or power stroke, the valve, however, continuing to move and reaching the position indicated in Fig. 5, just before the piston reaches the downward limit of its movement. During the next upward movement of the piston the valve moves from the position indicated in Fig. 5 to that indicated in Fig. 2, and in so doing it opens communication between the cylinder and the exhaust port D^2, allowing all of the burnt gases to pass out or be driven out during the upward movement of the piston, when the parts are again in position for the inspiration stroke.

Not only is the construction simple and easily manufactured, but the valve having been once set and timed, there is no possible opportunity for the parts to get out of adjustment. The dimensions of the ports may be made in such proportions that the gases will be admitted and permitted to escape without back-pressure on the piston, and at the same time so regulated as to avoid the sudden concussions incident to the use of valves which open to their full capacity, regardless of the speed of piston movement.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In an internal combustion engine, the combination with a cylinder and its piston, of a cylinder head having a spherical valve chamber therein with a port between said chamber and cylinder, and inlet and exhaust ports at diametrically opposite points, each displaced approximately ninety - degrees from the cylinder port, a rotary spherical valve mounted in said chamber and having a passage therein terminating in ports displaced approximately ninety degrees with respect to each other, and expansion packing rings extending around said valve at substantially right angles to each other, each packing ring having one of its ends terminating in proximity to the complemental packing ring at a point midway between the ends of said complemental ring.

2. In an internal combustion engine, the combination with the cylinder, piston working therein, and cylinder head having a spherical valve chamber therein with a port opening communication between said valve chamber and cylinder, and diametrically disposed inlet and exhaust ports, of a spherical valve mounted in said chamber and having a single passage therein terminating in ports displaced approximately ninety degrees with respect to each other, packing rings extending around said valve in planes intersecting said passage on opposite sides of the axis of the valve, and other packing rings extending around said valve at right angles to the first mentioned packing rings and in planes at one side of said passage and on opposite sides of the axis of the valve.

THOS. LANE.

Witnesses:
GEO. WINSHIP, Jr.,
GEO. S. DOYLE.

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