J. I. STEVENSON.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED DEC. 4, 1911.

1,066,160. Patented July 1, 1913.

Fig. 1.

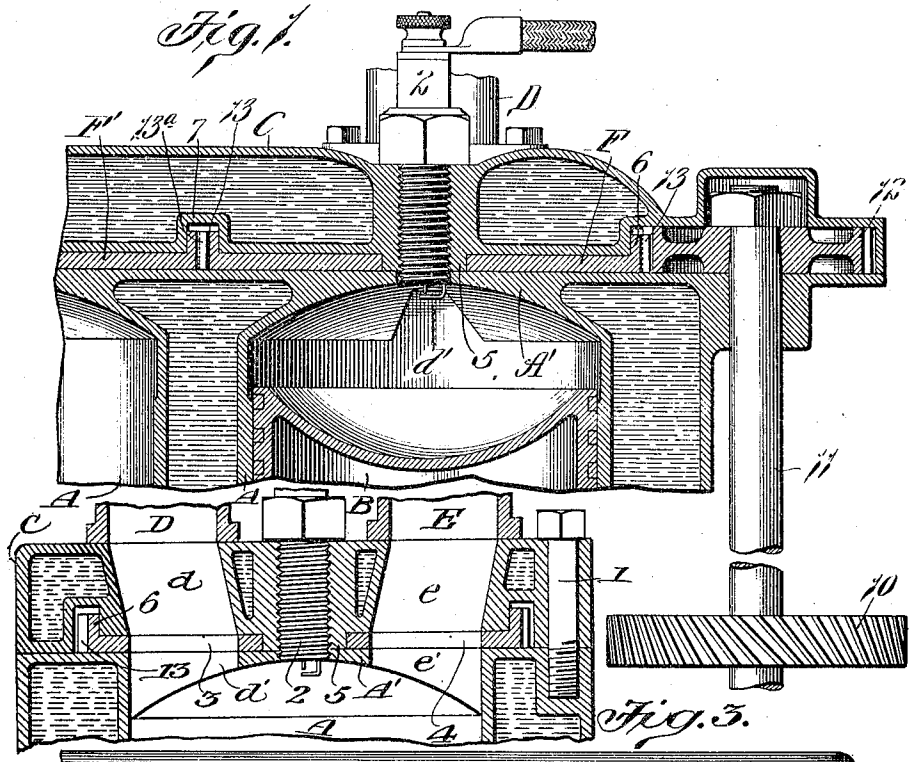
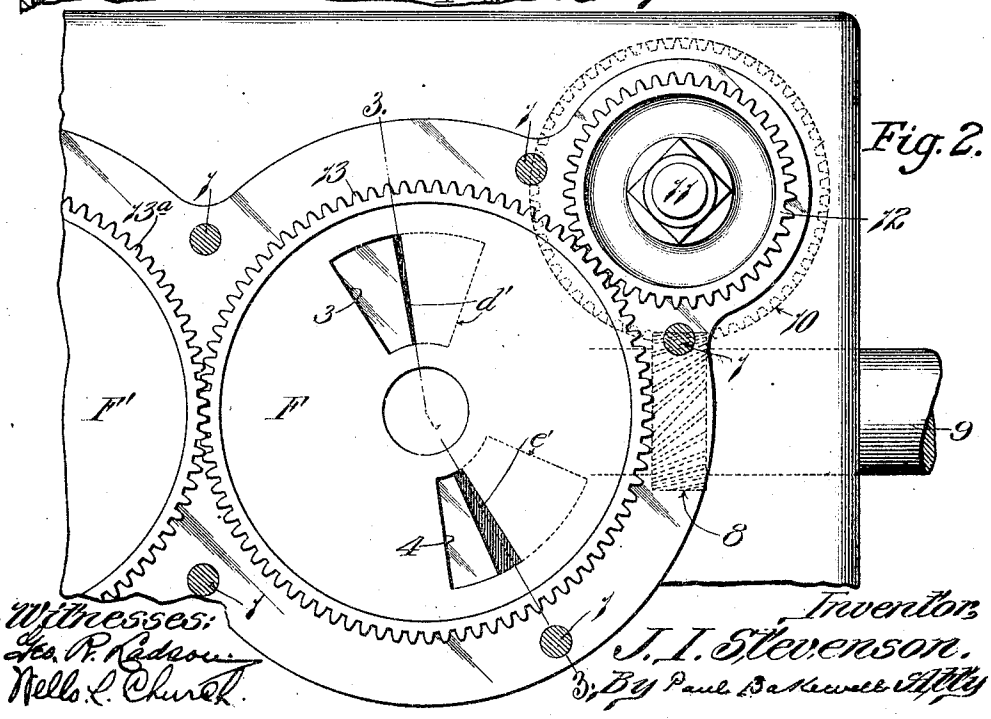


Fig. 3.

Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

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INTERNAL-COMBUSTION ENGINE.

1,066,160. Specification of Letters Patent. Patented July 1, 1913.

Application filed December 4, 1911. Serial No. 663,886.

To all whom it may concern:

Be it known that I, JOSEPH I. STEVENSON, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Internal-Combustion Engines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to internal combustion engines, and has for its object to provide an internal combustion engine in which the admission and exhaust of the gases is controlled by a rotatable valve or valves of novel design.

Figure 1 of the drawings is a vertical sectional view of one cylinder of an internal combustion engine constructed in accordance with my invention; Fig. 2 is a top plan view showing the head of the cylinder removed; and Fig. 3 is a vertical sectional view taken through the head of the cylinder on approximately the line 3—3 of Fig. 2.

Referring to Figs. 1, 2 and 3 of the drawings which illustrate the preferred form of my invention, A designates one cylinder of the engine, B the piston that is mounted therein, C the head of the cylinder which is preferably provided with a water-jacket that communicates with the water-jacket that surrounds the cylinder, and D and E the intake and exhaust pipes, respectively, that communicate with an admission port *d* and an exhaust port *e*, respectively, formed in the head of the cylinder, as shown in Fig. 3. The head C is detachably connected to the cylinder by bolts or other suitable fastening devices 1, and a spark plug 2 of any preferred type is mounted in an opening formed in the head C preferably at the center thereof.

The valve which controls the admission and exhaust of the gases consists of a rotatable disk F that is arranged on the under side of the head C of the cylinder, and said valve is provided with ports which permit the gases to enter and escape from the cylinder at certain periods in the cycle of operations of the engine. The engine shown in Figs. 1 to 3 is a four-cycle engine which is so designed that the crank shaft makes four revolutions to one revolution of the valve F and therefore said valve is provided with two ports 3 and 4, but I do not wish it to be understood that my invention is limited to an engine in which the valve is provided with two ports for the valve could be timed in various other ways without departing from the spirit of my invention. I prefer to provide the cylinder with a top wall A′, as shown in Figs. 1 and 3, which is spaced away from the under side of the head C a distance equal to the thickness of the valve F, said top wall A′ having ports *d′* and *e′* that aline with the ports *d* and *e*, respectively, in the head C of the cylinder. The top wall A′ of the cylinder protects the valve from the excessive heat produced by the explosion of the gases in the cylinder, and it coöperates with the head C of the cylinder to form a housing or chamber whose walls embrace the top and bottom faces of the valve and thus reduce the tendency of the valve to warp. The valve F which is arranged inside of said chamber or housing is rotatably mounted on a bearing 5 at the center of the head of the cylinder, and, if desired, said valve can be provided at its periphery with an annular flange 6 so as to reinforce and strengthen the valve and thus further reduce the possibility of warping, the head C of the cylinder being provided on its under side with an annular channel or groove 7 which receives said flange.

Any suitable means may be used for rotating the valves F of the engine, such, for example, as a spiral gear 8 on the crank shaft 9 of the engine that coöperates with a spiral gear 10 on the lower end of a vertically disposed valve-actuating shaft 11, as shown in Figs. 1 and 2. The valve shaft 11 is provided with a gear 12 that meshes with a gear 13 on the peripheral edge of the valve F of the first cylinder of the engine, and the gear 13 on said valve meshes with a similar gear 13^a on the valve F′ of the second cylinder, the valves of all of the cylinders being connected together and arranged in such a manner that the charges in the different cylinders will be compressed and ignited in the proper sequence.

When the piston B moves downwardly on its suction stroke one of the openings in the valve alines with the admission ports *d* and *d′* in the head C and in the top wall A′ of the cylinder and thus permits a charge to be drawn into the cylinder. During the two succeeding strokes of the piston, namely, the compression stroke and power strokes, the valve F closes the admission and exhaust

ports in the top wall of the cylinder and in the head C, and on the scavenging stroke of the piston one of the ports in the valve alines with the exhaust ports *e* and *e'* and thus permits the burnt gases to escape from the cylinder through the exhaust pipe E.

An engine of the construction above-described operates with very little noise, there is no possibility of carbon becoming deposited on the valves and thus preventing the valves from closing tightly; and another desirable feature of the engine is that the inlet and exhaust ports can be made large enough to permit a large volume of gas to be drawn into the cylinders. The valves which control the admission and exhaust of the gases are incased in water-jacketed chambers which have top and bottom walls that bear against both faces of the valves so that there is little danger of the valves warping and the valves are reinforced and strengthened further by annular flanges on the peripheries thereof.

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

1. In an internal combustion engine, a cylinder provided with an integral top wall, a removable water-jacketed head spaced away from said top wall so as to form a valve chamber, a bearing on the under side of said head at the center of said valve chamber, a disk-shaped valve arranged in said chamber and rotatably mounted on said bearing, said valve being provided with ports that register with alining ports formed in the head and in the top wall of the cylinder, and a spark plug mounted in said center bearing and projecting into said cylinder.

2. In an internal combustion engine, a cylinder provided with an integral top wall, a removable water-jacketed head spaced away from said top wall so as to form a valve chamber, a bearing on the under side of said head at the center of said valve chamber, a disk-shaped valve arranged in said chamber and rotatably mounted on said bearing, said valve being provided with ports that register with alining ports formed in the head and in the top wall of the cylinder, a spark plug mounted in said center bearing and projecting into said cylinder, a reinforcing and strengthening flange on the peripheral edge of said valve that prevents the valve from warping, an annular seat in the head for said flange, and a valve-operating mechanism that coöperates with teeth on said flange.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this twenty ninth day of November 1911.

JOSEPH I. STEVENSON.

Witnesses:

WELLS L. CHURCH,

GEORGE BAKEWELL.