C. MAYFIELD.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED JUNE 7, 1915.

1,170,769.

Patented Feb. 8, 1916.

Fig. 1.

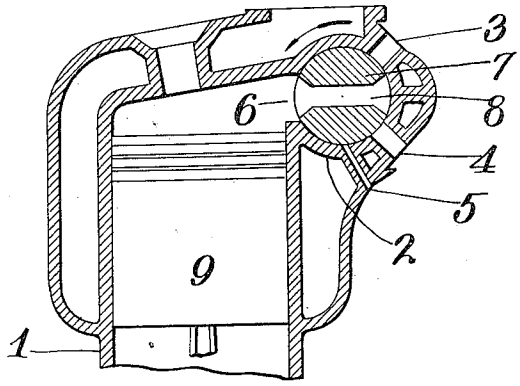


Fig. 2.

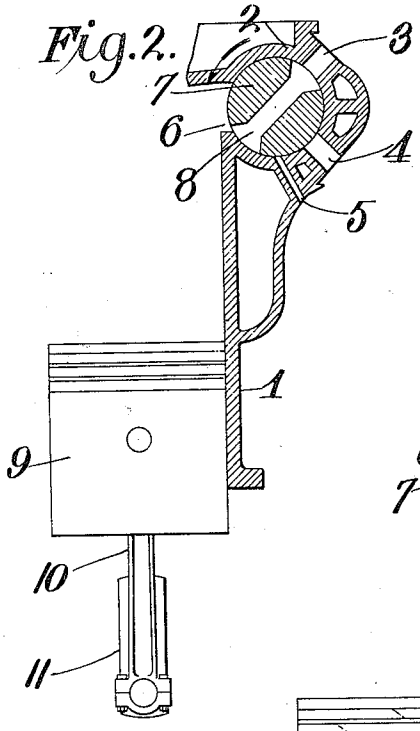


Fig. 3.

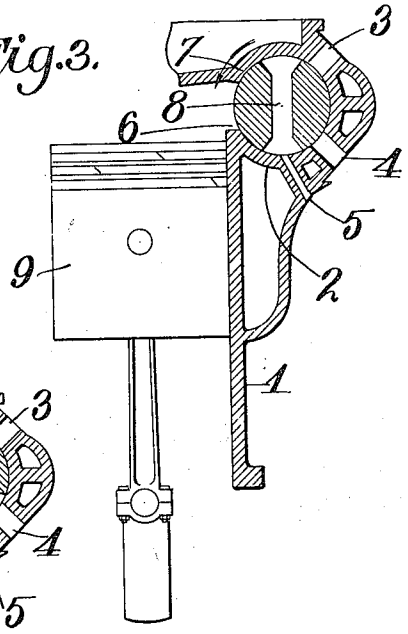
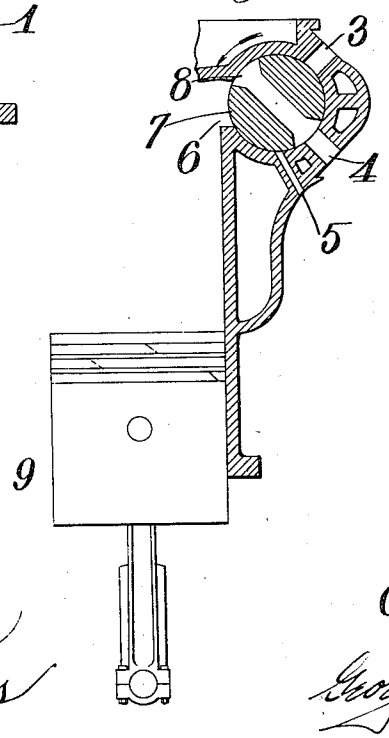


Fig. 4.



WITNESSES:

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INTERNAL-COMBUSTION ENGINE.

1,170,769. Specification of Letters Patent. Patented Feb. 8, 1916.

Application filed June 7, 1915. Serial No. 32,560.

To all whom it may concern:

Be it known that I, CHAMPION MAYFIELD, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates to multiple cylinder internal combustion engines and more especially to that type employing a valve having a port through which the intake and exhaust gases of the associated cylinder, alternately pass. Valves of the type mentioned are desirable because they are more uniformly heated and cooled, the valves having special ports for the cool or intake gases and other ports for the hot or exhaust gases. Heretofore such valves have been objectionable because of the loss of a small volume of fresh gas each time a cylinder was charged. This loss in the aggregate more than counterbalanced the advantage of a uniform distribution of heat, hereinbefore mentioned.

My object is to produce an engine provided with a single port valve for each cylinder and a casing port which coöperates with the valve port in establishing communication between the atmosphere and the intake port when under suction, so that fresh gas pocketed in the valve port shall be drawn back into the intake manifold of the engine, to form a part of the charge for the cylinder in which, at such time, the piston is making the suction stroke.

With this object in view the invention consists in certain novel and peculiar features of construction and combinations of parts as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawing, in which:—

Figure 1, is a vertical section of a part of an engine embodying my invention, the valve being about to establish communication between the cylinder and the intake port. Fig. 2, is a section showing the piston after it has made its suction stroke and the valve as it is about to close communication between the intake port and the cylinder. Fig. 3, is a view showing the piston in the position it occupies after the valve has turned a quarter revolution and the piston shaft a half revolution, the gas being compressed and ready for ignition with the parts in the position mentioned. Fig. 4, is another section showing the piston in the position it attains when ready to make its exhaust stroke, and showing the valve in exhaust position.

As my improvement does not effect or in any way change the organization of parts of a multiple cylinder engine, I have illustrated a single cylinder with the piston and valve thereof in different positions, and have not illustrated the intake or exhaust manifolds of the engine, it being understood that suction produced in any cylinder willl have its customary effect in the intake manifold and tend to draw air or gas therein into the cylinder whose piston at such time is making its suction stroke.

Referring to the drawing in detail, 1 indicates a cylinder of an internal combustion engine, 2 the valve casing thereof, 3 the intake port, 4 the exhaust port and 5 an auxiliary port of the valve casing, said casing also having an opening or port 6 through which communication is established between the valve casing and the cylinder. 7 is a rotary valve journaled in said casing and provided with a diametric passage or port 8 which is preferably flared at each end.

9 is the piston of the cylinder, 10 the piston rod connecting the cylinder with one of the cranks 11 of the engine shaft.

Assuming that the engine is in operation and that the piston is about to make its down stroke on suction and that the valve is turning in the direction indicated by the arrow, Fig. 1, it will be seen that as the pinion starts it tends to create a vacuum in the head end of the cylinder, whereby as the valve turns slightly and opens communication between the intake port and port 6, a charge of combustible gas is drawn through the intake port and the valve port or passage and port or opening 6 into the cylinder. As the piston completes its suction stroke and starts upward on its compression stroke the valve port or passage is about to pass out of communication with port 6 so as to present a solid surface as a closure for opening 6, and before this compression stroke of the piston is ended, the port or passage of the valve has attained a position intermediate between the positions shown in Figs. 2 and 3, so as to establish communication between intake port and the auxiliary port 5, at which time one of the other pistons of the engine is making its suction stroke and thus producing a suction

in the intake manifold which draws the gas pocketed in port or passage 8 back through port 3 into the intake manifold, which gas, in conjunction with fresh gas from the carbureter, not shown, enters the cylinder containing the piston making its suction stroke. Preferably just before the compression stroke of the piston is completed, the valve attains the position shown in Fig. 3 and in such position forms a complete closure for port or opening 6, so that as ignition and explosion of the compressed gas takes place, the full force shall be imposed to operate the piston. As this firing stroke of the piston is completed the valve attains the position shown in Fig. 4, so that as the piston again moves upward on its exhaust stroke, the exhaust gases shall be forced through port or opening 6, port or passage 8 of the valve, and the exhaust port 4 to the exhaust manifold, the valve passing out of communication with the exhaust port and attaining its initial position, as the piston completes its exhaust stroke and therefore again occupies the position in which it is shown in Fig. 1.

From the foregoing it will be seen that provision is made for two complete revolutions of the crank shaft to each half revolution of the valve, and that consequently each piston movement is attended by an eighth revolution on the part of the valve. Because of this each end of the valve port or passage alternately forms the receiving end for the cool or fresh gases and the receiving end for the hot or exhaust gases.

From the above description it will be apparent that I have produced an internal combustion engine of the single port valve type which is economical in its operation in that the gas which is pocketed in the valve port or passage after communication is closed between the intake port and the cylinder is drawn back through the intake port into the intake manifold and hence is not wasted by discharge into the atmosphere, as would result if provision was not made for establishing communication between the intake port and the auxiliary port, as hereinbefore explained.

I claim:

In an internal combustion engine, the combination with a cylinder of a communicating valve casing having intake, exhaust and auxiliary ports, of a rotary valve journaled in the casing and provided with a single port for establishing communication successively between the intake port and the cylinder, the intake port and the auxiliary port and the cylinder and the exhaust port.

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

CHAMPION MAYFIELD.

Witnesses:
PERCY A. BUDD,
G. Y. THORPE.

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