R. T. WHITE.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED FEB. 17, 1912.

1,042,181. Patented Oct. 22, 1912.

Fig. 1

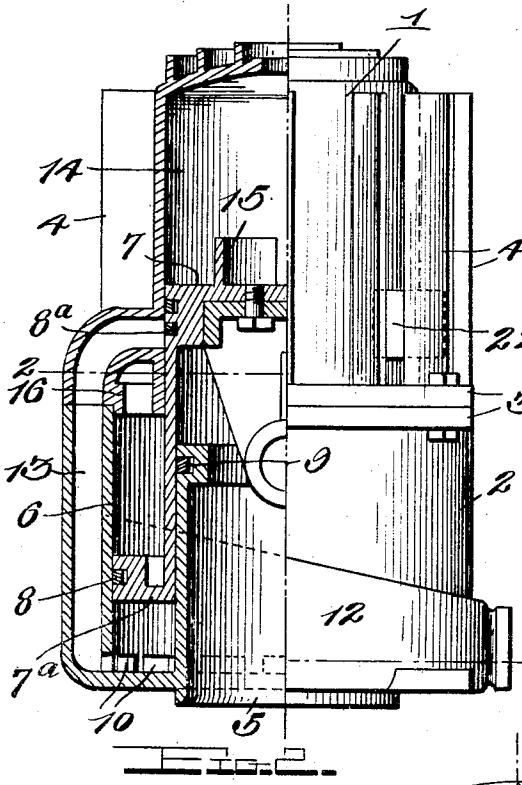


Fig. 2

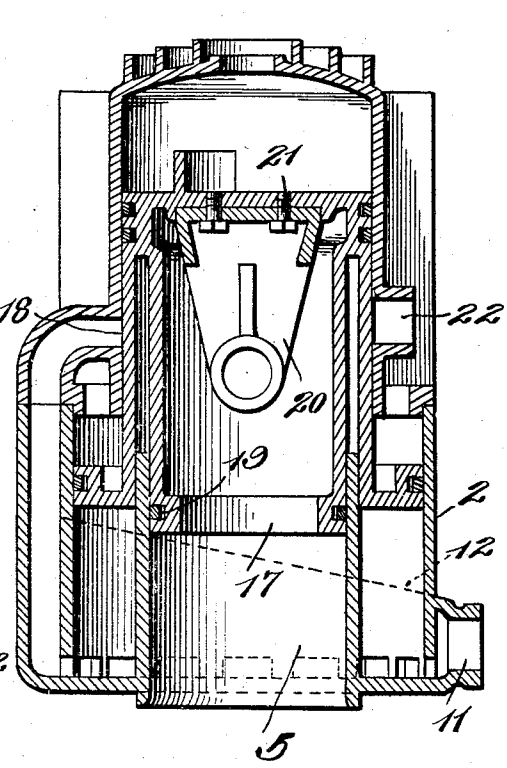
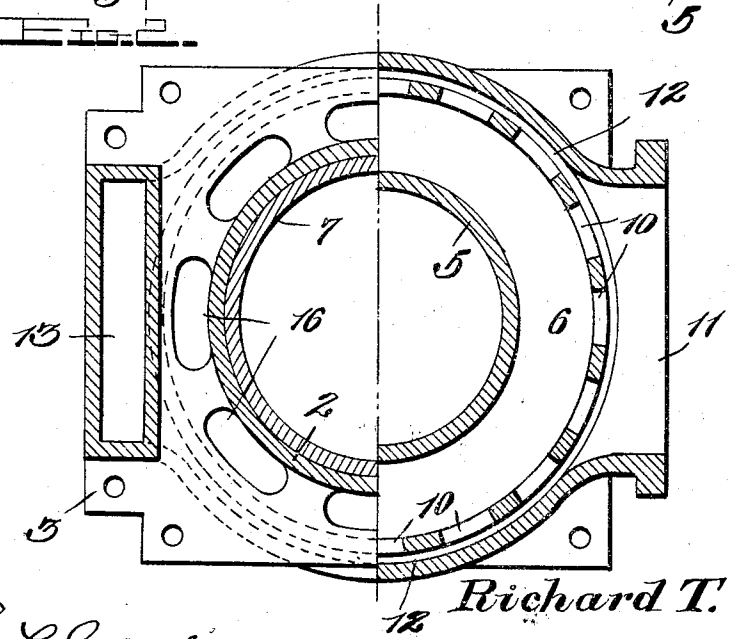


Fig. 3



Witnesses

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INTERNAL-COMBUSTION ENGINE.

1,042,181. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed February 17, 1912. Serial No. 678,232.

To all whom it may concern:

Be it known that I, RICHARD TROTTER WHITE, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification, reference being had to the accompanying drawings.

This invention comprehends certain new and useful improvements in internal combustion engines of the two cycle type, and the invention has for its primary object a simple and efficient construction of engine or motor of this character which will possess to a high degree the characteristics of compactness, capability, of endurance and long service, and efficiency in compression and in preventing leakage and all liability of any diminution of efficiency by excessive wear upon the moving parts.

The invention also has for its object an improved internal combustion engine of the two cycle type embodying a novel and advantageous construction and formation of compression chamber, whereby the gases will be thoroughly mixed and properly entered into the explosion chamber. And the invention also aims to generally improve this class of devices and to render them more useful and commercially desirable.

With these and other objects in view, as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts as will be hereinafter more fully described and claimed.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawing in which,

Figure 1 is a half side elevation and half sectional view of one form or embodiment of my invention. Fig. 2 is a horizontal sectional view on the broken line 2—2, of Fig. 1, and, Fig. 3 is a longitudinal sectional view of another embodiment of the invention.

Corresponding and like parts are referred to in the following description and designated in the accompanying drawing by like reference characters.

The cylinder of my improved internal combustion or explosive engine is constructed in an upper section 1 and a lower section 2, said sections being coupled together by bolts passing through their adjoining flanges 3. The upper section 1 is cooled in the present instance by means of air passing between vertically disposed vanes 4, although it is to be understood that the invention is not limited in this regard, but that any method of cooling may be employed.

The lower section 2 of the cylinder is formed with an inner cylindrical wall 5 which communicates with an open crank case (not shown), and between said inner wall 5 and the main outer wall of the lower section 2, an aspirating and compression chamber 6 is formed, in which the outstanding annular rim 7^a of the piston 7 is mounted for a reciprocating movement. In that embodiment of the invention illustrated in Figs. 1 and 2, the rim 7^a of the piston 7 carries a packing ring 8, the main portion or head of the piston carries corresponding rings 8^a adapted to work against the interior wall of the upper section 1 of the cylinder, and the inner side of the piston is packed by means of a ring 9 seated in a socket formed in the exterior wall of the cylindrical portion 5 in the lower section 2, as best illustrated in Fig. 1. By this means, the piston is properly packed and is also efficiently guided, it being noted that the exterior wall of the piston engages the interior wall of the section 1, while the interior wall of the piston engages the exterior wall of the cylindrical portion 5 of the lower section 2. By this means, all leakage is practically prevented.

The aspirating and compression chamber 6 is formed in its side wall and at the bottom thereof, in the present instance, with any desired number of ports 10, sundry of which communicate directly with an inlet opening 11 which, in the present instance, is laterally elongated, as best illustrated in Fig. 2. The ports 10 also communicate, as does the passage 11, with an annular compression chamber 12 which encircles the chamber 6 and which opens at one side thereof into a vertically disposed and laterally elongated passage 13 which opens into the section 1 of the cylinder, preferably near the lower end thereof. At this point, it will be understood that when the piston 7 moves upwardly on its aspirating stroke, the charge of gaseous fuel will be drawn in through the passage 11, into the chamber 6 by the suction effect of the outstanding annular rim 7^a of the

piston 7. Thus, the chamber 6, its encircling chamber 12, and the passage 13 (the latter, at least, to some extent), will be filled with the charge and consequently on the outward or compression stroke, such charge will be compressed, and as soon as the head of the piston 7 passes the upper end of the passage 13, the charge will be instantly admitted into the explosion chamber 14 and ignited so as to drive the piston in the required direction.

It is to be particularly noted that the relatively narrow annular encircling chamber 12 increases in height and consequently in area gradually from the inlet end of the passage 11 until it reaches and merges into the passage 13, whereby the gases will be forced, on the compression stroke, toward the passage 13 and the greatest efficiency of compression secured.

It is also to be understood that there is a check valve controlling the admission of the gaseous charges from the carbureter into the passage 11. Preferably, this check valve (not shown) is located close to the inlet passage 11, and in case the engine embodying the improvements of my invention comprises more than one cylinder, the manifold leading from the carbureter to the various inlet passages 11 of the respective cylinders will have in each branch, one of the said check valves, close to the inlet passage 11.

15 designates a deflector which is secured to the head of the piston 7 so as to properly direct or deflect the gases toward the upper end of the explosion chamber 14.

The upper end of the chamber 6 is in communication with the atmosphere by means of a circularly extending series of segmental ports 16, whereby any tendency to produce an air cushion back of the outstanding annular rim 7^a of the piston, will be prevented, and at the same time on the upward or aspirating stroke, currents of air will be forced upwardly through these ports 16 and up between the radially projecting and vertically disposed vanes 4 so as to tend to carry off the hot gases and maintain the engine in a properly cooled condition.

That embodiment of my invention illustrated in Fig. 3 is substantially like that illustrated in Figs. 1 and 2 hereinbefore specifically described, except that in that form illustrated in Fig. 3, the piston 7 is formed with inner and outer walls designated 17 and 18, respectively, the inner wall being provided at its lower end with a packing ring 19 which bears against the inner side of the cylindrical inner portion 5 of the lower section 2. In other words, the differences consist in a different manner of packing the piston, but otherwise, the two embodiments are substantially alike.

From the foregoing description in connection with the accompanying drawing, the operation of my improved internal combustion engine will be apparent. In the practical use of the device, when the piston 7 moves upwardly, it will aspirate the charge, and when the piston moves downward, the charge will be compressed in the lower end of the chamber 6 below the outstanding annular rim 7^a of the piston and will also be compressed in the encircling chamber 12 and in the passage 13 and will be instantly admitted into the explosion chamber 14 as soon as the upper end of the passage 13 is passed by the upper end of the piston.

Preferably, the piston is connected to the pitman or connecting rod by a casting 20 which is secured by bolts 21, or otherwise, in a recess formed in the head of the piston, all necessity for boring or otherwise forming openings in the sides of the piston being thereby avoided.

22 designates the exhaust port in the upper section 1 of the cylinder, designed to be opened by the piston in its downward traverse or movement so as to permit the escape of the burned gases.

While the accompanying drawing illustrates what I believed to be the preferred embodiment of my invention, it is to be understood that the invention is not limited thereto, but that various changes may be made in the construction, arrangement and proportions of the parts without departing from the scope of the invention, as defined in the appended claims.

What I claim is:—

1. An internal combustion engine of the two cycle type, including a cylinder formed with an open crank case end and with an annular compression chamber surrounding such end, and with an encircling chamber surrounding the compression chamber, and with ports establishing communication between the compression chamber and the said encircling chamber at the crank case end of said chamber, the cylinder being further formed with an explosion chamber and with a lontitudinally disposed passage leading from the encircling chamber and adapted to open into the explosion chamber, the encircling chamber gradually increasing in area toward said passage, and a piston mounted to reciprocate in said cylinder and to control the connection between the explosion chamber and said passage.

2. An internal combustion engine of the two cycle type, including a cylinder constructed in upper and lower sections connected together, the lower section being formed with an inner cylindrical wall constituting an open crank case end and being formed with an annular compression chamber surrounding said wall, a piston movable in the compression chamber around the exterior of said wall, the upper section constituting an explosion chamber, the lower

section being formed at its crank case end with a fuel inlet opening and with an encircling chamber surrounding the compression chamber, with ports establishing communication between the compression chamber and the said encircling chamber, the cylinder being also formed with a longitudinally extending passage diametrically disposed with reference to the inlet opening leading from the said encircling chamber and adapted to open into the explosion chamber.

3. An internal combustion engine of the two cycle type, including a cylinder constructed in upper and lower sections connected together, the lower section being formed with an inner cylindrical wall constituting an open crank case end and being formed with an annular compression chamber surrounding said wall, a piston movable in the compression chamber around the exterior of said wall, the upper section constituting an explosion chamber, the lower section being formed at its crank case end with a fuel inlet opening, with a chamber encircling the compression chamber and with ports establishing communication between the compression chamber and the encircling chamber, the lower section being further formed with a longitudinally extending outlet passage diametrically disposed to the inlet opening and leading from said encircling chamber and adapted to open into the explosion chamber, said encircling chamber increasing in height gradually from the inlet opening toward the said outlet passage.

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

RICHARD TROTTER WHITE.

Witnesses:

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