

July 15, 1924.

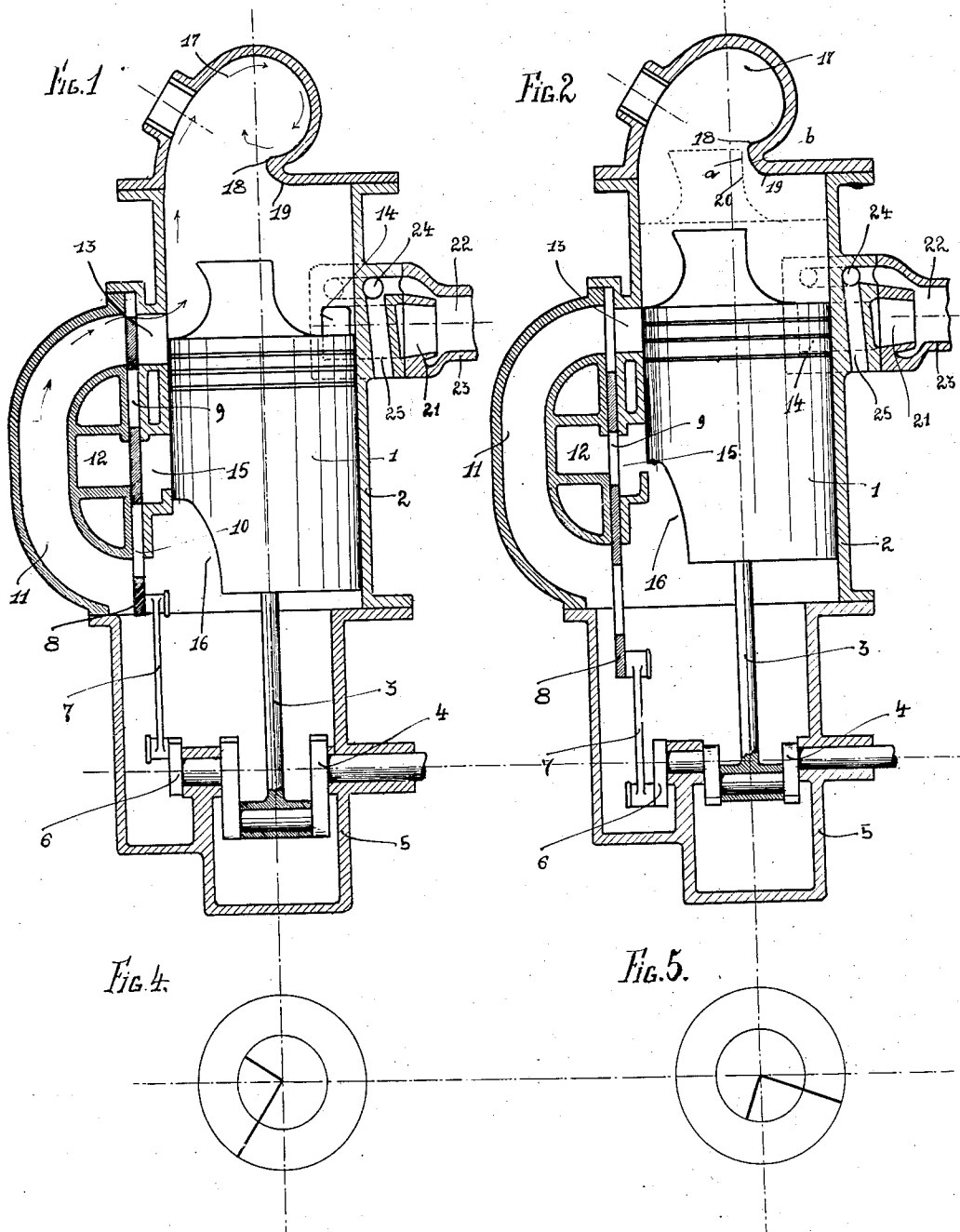
1,501,855

F. LAGUESSE

INTERNAL COMBUSTION ENGINE

Filed April 4, 1922

2 Sheets-Sheet 1



Inventor

F. Laguesse

By Laurence Laguesse
Att'y

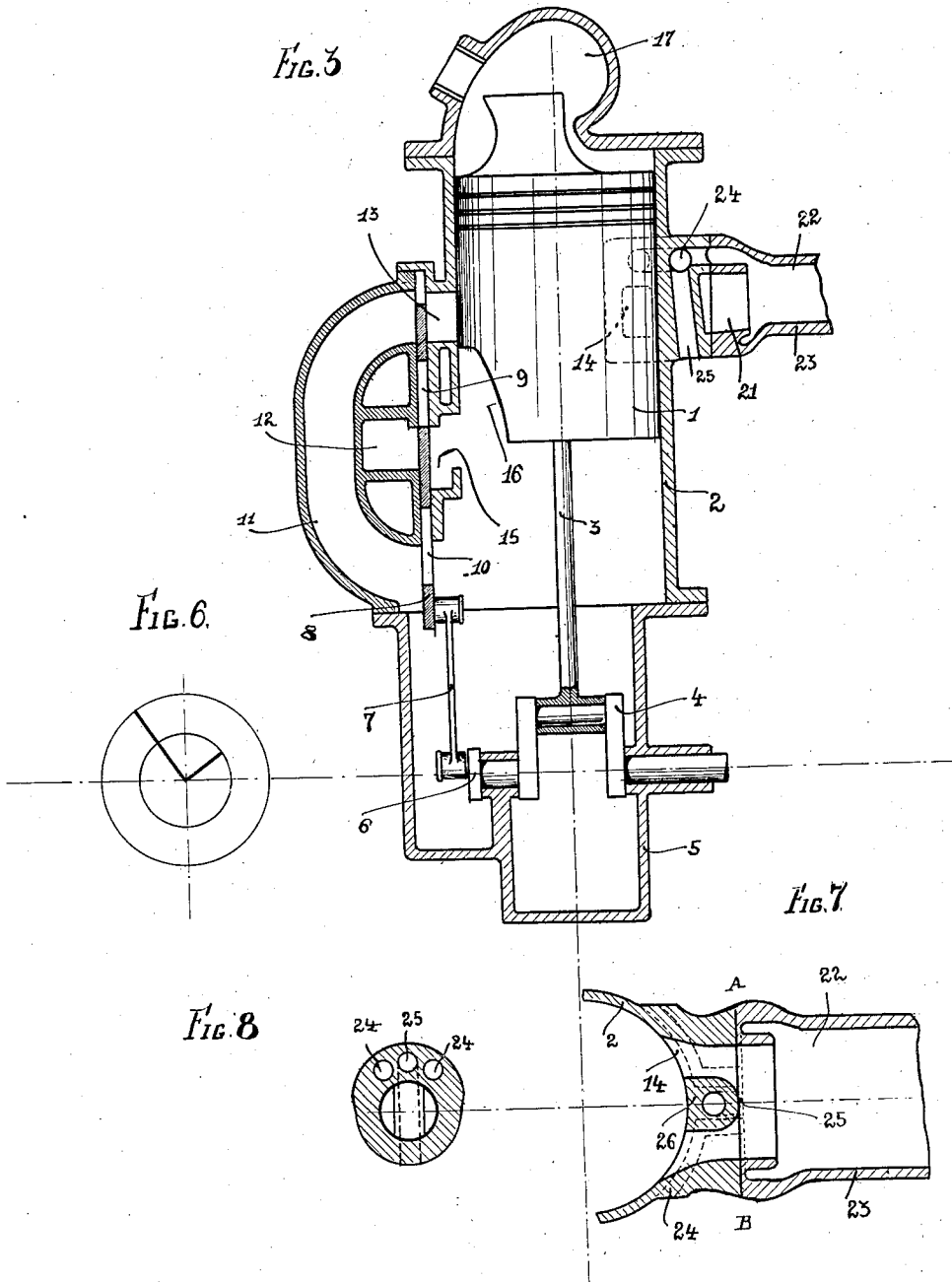
July 15, 1924.

1,501,855

F. LAGUESSE
INTERNAL COMBUSTION ENGINE

Filed April 4, 1922

2 Sheets-Sheet 2



Inventor
F. Laguesse
By *Lawrence Laguer*
Att'y

Patented July 15, 1924.

1,501,855

UNITED STATES PATENT OFFICE.

FERNAND LAGUESSE, OF HERSTAL, BELGIUM.

INTERNAL-COMBUSTION ENGINE.

Application filed April 4, 1922. Serial No. 549,555.

To all whom it may concern:

Be it known that I, FERNAND LAGUESSE, a subject of the King of Belgium, and resident of Herstal, Belgium, have invented certain new and useful Improvements in and Relating to Internal-Combustion Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked therein, which form a part of this specification.

This invention relates to the distribution in two stroke, internal combustion engines, having preliminary compression of the fuel mixture in the casing, and in which the cylinder admission and exhaust ports are situated at the same level, while a casing admission port for the fuel mixture is provided at another point.

A special object of the invention is to increase, as much as possible, the duration of admission into the casing and into the cylinder, while retaining the necessary advance of exhaust during descent of the piston.

To effect this, according to the invention, the control of the admission ports to the cylinder and the casing, is by means of the piston, and a single slide valve. The valve has two ports corresponding to the above said ports and is actuated by a crank offset 90° with respect to the motor crank. Accordingly, during descent of the piston, admission to the cylinder may still be closed by the slide valve for a time, and then opened by the valve, the admission port to the casing being closed by the slide valve during this descent of the piston, while during the ascent of the piston, the latter alone controls the distribution of the admission ports of the casing and the cylinder.

The accompanying drawings illustrate by way of example one mode of carrying the invention into effect.

In the drawings, Fig. 1 is a longitudinal sectional elevation showing the engine at the beginning of the exhaust and of the admission stroke.

Fig. 2 is a longitudinal sectional elevation of the engine at the moment when the exhaust and admission ports are closed and when the port of admission into the casing is open.

Fig. 3 shows in sectional elevation the engine at the beginning of expansion period.

Figs. 4, 5 and 6 illustrate diagrammatically the position of the cranks operating the valve gear and the driving piston, corresponding respectively to each of the positions illustrated in Figs. 1, 2 and 3.

Fig. 7 illustrates on a larger scale, a horizontal section of the exhaust orifice of the cylinder of the engine.

Fig. 8 is a vertical section along the line A—B of Fig. 7.

The engine comprises a piston 1 moving in a cylinder 2 according to a two-stroke cycle and connected by means of a connecting rod 3 to a crank shaft 4 mounted in a casing 5.

The crank shaft has one end provided with a crank 6 operating by means of a connecting rod 7 a slide valve 8 provided with two ports 9 and 10.

The said valve in combination with the piston of the engine, controls the passage of the gases into the pipes 11 of admission to the sprayer and of the pipe 12 of admission to the casing.

According to the mode of construction illustrated in the drawings, the admission ports 13, the exhaust ports 14 and the cylinder 1 are situated at the same level. Therefore, at the end of the expansion period in the cylinder, as shown in Fig. 1, the piston of the engine uncovers the ports 13 and 14 simultaneously in such a manner that in order to maintain the early exhaust which is necessary, the valve has also to close the admission pipe 11 during a certain time.

The crank 6 operating the valve having already passed at that moment considerably beyond the dead point, the speed of displacement of the valve gear producing the opening of the admission pipe 11 will be maximum for the said opening.

The passage into the cylinder of fresh gases compressed into the crank casing by the piston during its descending stroke can then be effected through the admission pipe 11 until the piston comes in its ascending stroke in the position illustrated in Fig. 2.

At that moment the admission and the exhaust ports are simultaneously closed by the piston in contradistinction to what happens in ordinary engines in which the admission port is closed before the exhaust port, whereby the duration of admission is reduced and the pressing back of a small

portion of fresh gas through the exhaust port is rendered possible.

At the same time, towards the middle of the ascending stroke of the piston, the latter uncovers the admission port 15 due to a recess 16 provided in the lower part of the piston.

The crank 6 of the valve gear 7 is then at about its lower dead point, in such a manner that the admission pipe 12 is not closed by the valve gear and that the piston alone controls the very rapid opening of the admission port 15.

The admission may then take place until the piston is in the position illustrated in Fig. 3.

The admission pipe 12 connecting the carburetter to the casing is then completely closed by the valve 8 while the piston commences its descending stroke in such a manner that there is no compression into the carburetter.

The fresh gases introduced into the cylinder at the end of the expansion stroke through the admission pipe 11 are directed by the deflector of the piston towards the head of the cylinder along the inner wall of the latter as shown in Fig. 1.

They are thus brought in an extension 17 arranged on the head of the cylinder and intended—owing to the suitable shape of the inner wall—to produce a current of the fresh gas in a closed circuit.

The said inner wall has a curvature which moves apart until a line is reached separating the said wall from an incline 19 descending towards the opposite side of the entrance wall for the fresh gas.

It should be pointed out that during the ascending stroke of the piston illustrated in dotted lines in Fig. 2, the gas which is compressed between the face 20 of the piston deflector and the portion 19 of the head of the cylinder, is caused to pass through the channel formed by a portion *a* of the face 20 parallelly to the axis of the cylinder and a portion *b* of the deflector 19 of the cylinder head. In this narrow passage the air has a high speed and produces numerous eddies in the gas which is compressed inside the head of the engine. This stirring of the mixture is very advantageous for a good ignition and for a complete combustion of the mixture.

On the other hand, with the object of avoiding the formation of too great a vacuum inside the cylinder 2 when the burnt gas leaves through the exhaust ports 14, use is made of a conical extension 21 acting as an injector intended to bring air from the outside into the exhaust pipe.

The said conical extension 21 commences in the neighbourhood of the exhaust pipes 14 and opens into a chamber 22 formed by the exhaust pipes 23, and which is placed in communication with the outside air, on the one hand by means of conduits 24 provided in a suitable manner in the borders of the exhaust orifice, and on the other hand by means of a conduit 25 provided in the partition 26 arranged across the exhaust port 14.

The burnt gas leaving through the conical extension 21 forms a vacuum in the chamber 22 which vacuum produces a strong influx of fresh air through the conduits 24 and 25.

This influx of fresh air helps more especially to prevent a vacuum from being produced in the compression chamber of the cylinder and at the same time to cool the borders of the exhaust orifice 14.

What I claim is:

A two cycle engine comprising inlet and exhaust ports positioned at the same level, a conduit connecting the cylinder inlet port and the engine crank casing, a crank casing inlet port, a piston and a single slide valve, said slide valve being provided with two ports corresponding to the cylinder and casing inlet ports, said last two ports being controlled by the piston and slide valve; a crank offset from the engine crank by approximately 90° for operating the valve, whereby, on the descent of the piston, the cylinder inlet port is first closed by the valve for a time, then opened by the valve, the casing inlet port being closed by the valve during the descent of the piston, and on the upstroke of the piston, the piston controls the cylinder and the casing inlet ports.

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

FERNAND LAGUESSE.

Witnesses:

SÉVERINE HANSENNY,
CHARLES MERCKALL.