

J. KYLLIAINEN.
INTERNAL COMBUSTION MOTOR.
APPLICATION FILED OCT. 9, 1912.

1,235,145.

Patented July 31, 1917.

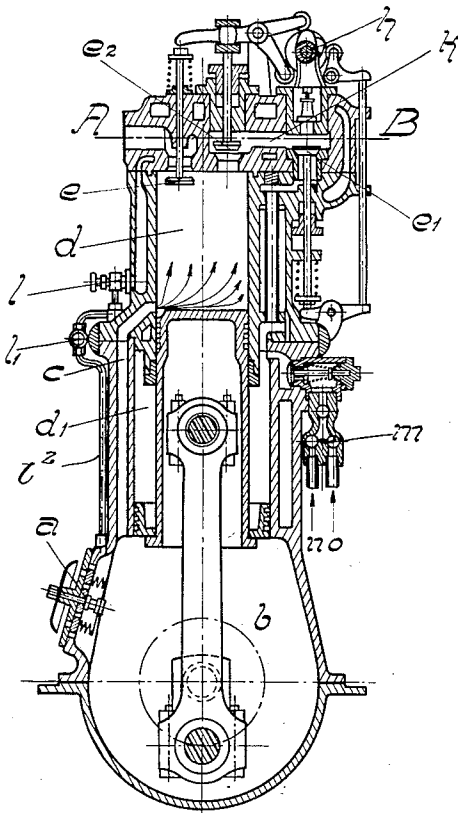


Fig. 1.

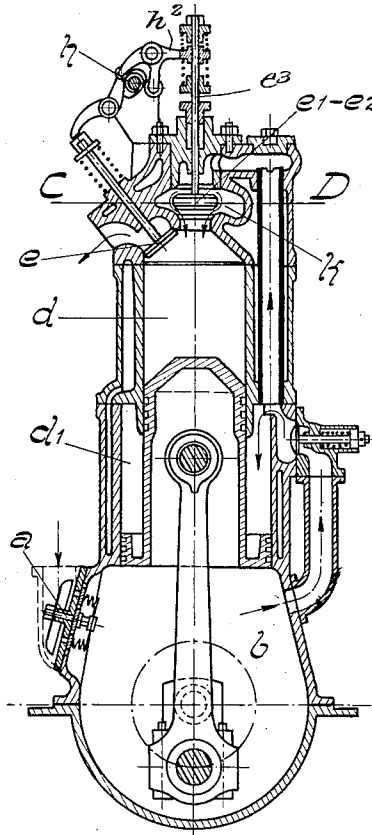
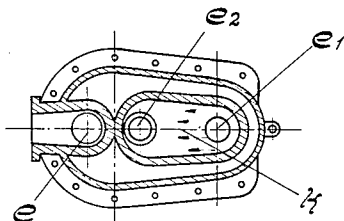
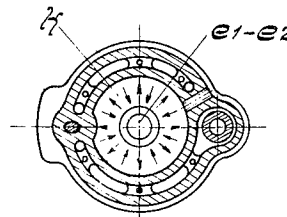


Fig. 3.



A-B.

Fig. 2.



C-D.

Fig. 4.

WITNESSES

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INTERNAL-COMBUSTION MOTOR.

1,235,145.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JUHANA KYLLIÄINEN, a citizen of Finland, residing at Helsinki, Finland, Russia, have invented certain new and useful Improvements in Internal-Combustion Motors, of which the following is a specification.

This invention relates to internal combustion engines with a separate compression and explosion space, separated from the main cylinder by means of a valve. According to the invention compressed air or mixture from a closed crank casing or from an annular cylinder expels the burnt gases from the said compressing chamber into the main cylinder at the end of the expansion stroke, and the main piston then expels these gases from the cylinder, there being only a small clearance space between the upper end of the piston and the cylinder head.

In the accompanying drawings

Figure 1 is a central vertical sectional view of a two-cycle engine according to the invention;

Fig. 2 shows a section on the line A—B in Fig. 1;

Fig. 3 is a central vertical sectional view of a modified form of construction; and

Fig. 4 shows a section on the line C—D of Fig. 3.

Referring to Figs. 1 and 2 the compression space k is connected with the cylinder d by means of a valve e_2 . The exhaust valve e is arranged at the upper end of the cylinder. The charge is pressed from an annular cylinder d_1 through pipes in to the compression space k . When high speed and greater charges are wanted both the annular cylinder and the crank casing may be used, the mixture first being compressed in the crank casing and from there taken to the annular cylinder. The engine works in the following way:—

During the expansion stroke the differential piston draws the charge into the annular cylinder d_1 through the valve m and the pipes n , o . At the end of the stroke the exhaust valve e opens and the pressure is released. On the first part of the up-stroke both the inlet valve e_1 to the compression chamber and the valve e_2 to the cylinder are open, the fresh charge from the annular cylinder entering the compression chamber through e_1 and pushing the burnt gases from the compression chamber through e_2 into the cylinder, from whence they are

expelled by the main piston through the exhaust valve e . As the charge enters the compression chamber from one end and the burnt gases leave it from the other, the burnt gases do not mix with the charge, but escape before it with the smallest possible contact surface. At the time when the charge has filled the compression chamber k the valve e_2 is closed and the annular piston during the up-stroke compresses the charge in the compression chamber, the main piston at the same time expelling the burnt gases from the cylinder. Near the end of the up-stroke the exhaust valve e closes and then the inlet valve e_1 , whereupon the valve e_2 opens and admits the compressed charge into the clearance space between the piston and the cylinder head. The ignition then takes place in the compression chamber and the working stroke begins.

Between the crank casing and the main cylinder d there is shown in Fig. 1 a channel c through which in the lowest position of the piston water received into the crank casing b , from the cooling system of the engine, through valves l , l_1 and pipe l_2 , may be blown into the cylinder from the crank casing by means of air drawn into the crank casing through the inlet valve a . This however, is not essential to the present invention.

Instead of the two valves e_1 and e_2 there is shown, in Figs. 3 and 4, one double seated valve e_1 — e_2 , the upper seat controlling the inlet to the compression chamber k and the lower seat controlling the connection between the chamber k and the main cylinder. This double seated valve is mounted on the rod e_3 reciprocated by the elbow lever h_2 rocked by the cam h .

The operation of the engine of Figs. 3 and 4 is as follows:—

During the down stroke air is drawn into the cylinder d , and at the end of the down stroke, the exhaust valve e opens. At the beginning of the up stroke, the valve e_1 , e_2 takes an intermediate position, whereby the compression chamber K is open both to the working cylinder and the new charge, whereby the new charge pushes out from the compression chamber in to the cylinder, the burnt gases of the previous ignition, whence they are expelled by the piston on the completion of the up stroke.

When the new charge fills the compression chamber, the valve e_1 , e_2 assumes its

lowest position, whereupon the new charge is compressed in the compression chamber, by the action of the annular piston during its up stroke. On the completion of the up stroke the valve e_1, e_2 assumes its uppermost position, and the compressed charge is admitted into the clearance space of the working cylinder after which ignition takes place.

10 I claim:

1. In an internal combustion engine, the combination of a working cylinder; a differential cylinder; pistons therein; a compression chamber having valved connection with said cylinders respectively; an exhaust valve at the end of said working cylinder; means controlling said valved connection for establishing communication between the compression chamber and both cylinders during the beginning of the instroke; disestablishing communication between the chamber and working cylinder during compression, and establishing communication of the chamber with the working cylinder and disestablishing communication of the chamber with the differential cylinder during ignition; and means for opening the exhaust valve during the instroke.

2. In an internal combustion motor, the combination of a working cylinder; a means for feeding and compressing fuel mixture; a compression chamber having oppositely disposed valve seats communicating with

the feeding means and cylinder respectively; a valve disposed between said seats and adapted to sit upon either of the seats; and means for moving said valve to an intermediate position during the beginning of the instroke; to a position closing communication with the cylinder during the latter part of the instroke, and to a position to close communication with the feeding means during ignition.

3. In an internal combustion motor, the combination of a working cylinder; a means for feeding and compressing fuel mixture; a compression chamber having oppositely disposed valve seats communicating with the feeding means and cylinder respectively; a valve disposed between said seats and adapted to sit upon either of the seats; means for moving said valve to an intermediate position during the beginning of the instroke, to a position closing communication with the cylinder during the latter part of the instroke, and to a position to close communication with the feeding means during ignition; an exhaust valve in the end of the cylinder; and means for opening the exhaust valve during the instroke.

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

JUHANA KYLLIÄINEN.

Witnesses:

ANNA SCHROEDER,
HJALMAR OKER PLUM.