

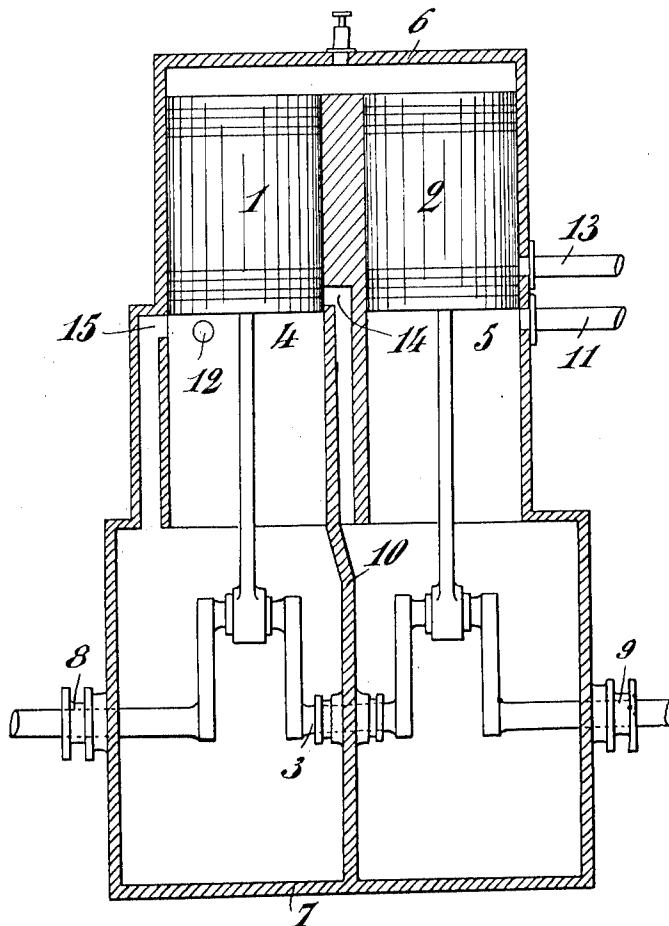
O. DEPREZ & A. RICHIR.
VALVELESS TWO-CYCLE MOTOR.
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1,061,528.

Patented May 13, 1913.

2 SHEETS-SHEET 1.

Fig. 1.

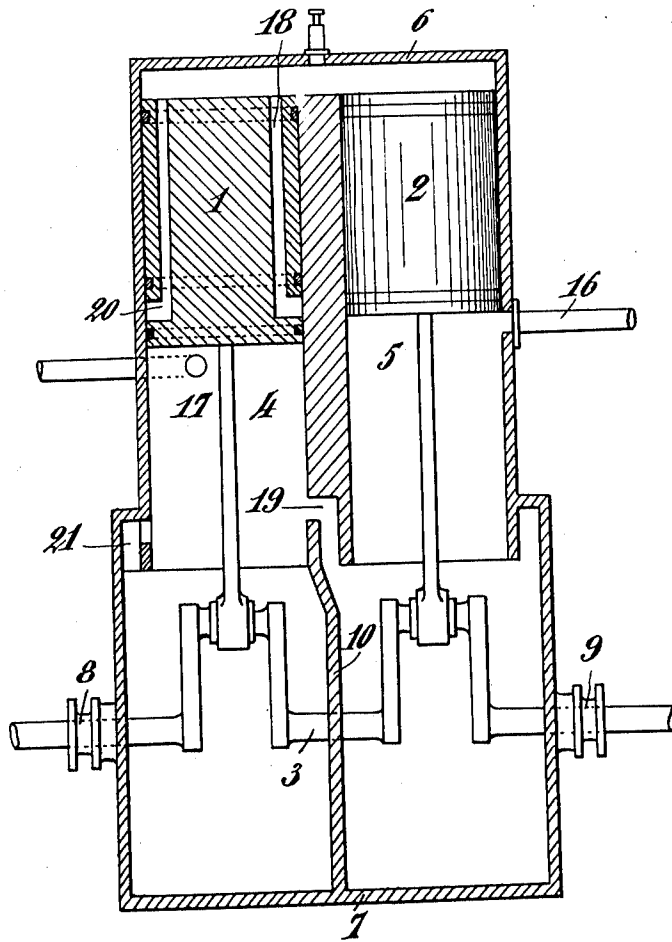


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Fig. 2.



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UNITED STATES PATENT OFFICE.

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VALVELESS TWO-CYCLE MOTOR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, OSCAR DEPREZ and ARMAND RICHIR, subjects of the Kingdom of Belgium, residing in Brussels and Anderlecht-Brussels, respectively, in the Kingdom of Belgium, have invented certain new and useful Improvements in Valveless Two-Cycle Motors; and we 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 two-cycle motors and has for its object the elimination of valves, whereby higher compression than usual may be attained, and the employment of heavy petrol, paraffin and even petroleum residues is made possible, owing to the absence of valves.

In the accompanying drawings—Figure 1 is a vertical section of an explosion engine embodying one form of our invention, and Fig. 2 is a similar view, of a modified form.

In both figures, the pistons 1 and 2 are connected with a crank shaft 3 and move in the cylinders 4 and 5 having a common head 6 between which and the ends of the cylinder is formed the combustion chamber. The shaft 3 rotates in a closed crank case 7 and passes through the walls thereof in suitable stuffing boxes 8 and 9. A wall 10 divides the crank case into two parts. In Fig. 1 the pistons are shown at the end of their outward stroke or compression stroke. During said stroke, the piston 2 has produced behind it a vacuum in the right hand part of the crank case and at the moment it uncovers the port 11, which is connected with the outer atmosphere, the air is drawn into said part of the crank case. On the side of piston 1 a similar action has been produced during said stroke. The vacuum being produced behind said piston in the left hand part of the crank case the moment that the port 12 connected with the carbureter is uncovered the carbureted air is drawn into said part of the crank case. The mixed fuel compressed in the combustion chamber of the cylinder being ignited, the explosion forces the pistons which describe their inward

stroke. During said stroke the pistons open and uncover successively the ports 13, 14, 15. The port 13 is first uncovered by the piston 2 and connects the cylinders with the discharge. Immediately thereafter the piston 1 uncovers the port 14 connected with the right hand part of the crank case wherein the air drawn through port 11 has been compressed during the return stroke of the piston 2. Said air is discharged from the cylinder 4 whence it passes through the combustion chamber into the cylinder 5 to sweep out the gases through port 13. Lastly the piston 1 uncovers the port 15 which is connected with the lefthand part of the crank case where the carbureted air has been compressed during the return stroke of the piston 1. The carbureted air passes into the cylinder 4 and the cylinder 5 and at the same time the air admitted at 14 continues to come in to be mixed with the carbureted air. The pistons then begin their outward or compression stroke during which they close successively the ports 15, 14 and 13 compress the mixed fuel in the combustion chamber of the cylinders and produce a vacuum behind them in the right hand and left hand parts of the crank case, and open at or toward the end of the stroke the ports 12 and 11 to draw after them carbureted air on one side and fresh air on the other. The explosion of the gas being produced the pistons move inwardly and the same operations begin again. A two stroke cycle motor is produced in which there is an initial compression and all valves and distributing mechanisms are omitted. It should be noticed that ports 11 and 12 are opened or closed at the same time and that the opening and closing of the ports 13, 14 and 15 are regulated so that the carbureted air admitted into the cylinders will in no case be brought into contact with the burnt gases.

The form shown in Fig. 2 differs slightly from that shown in Fig. 1. Instead of the ports 11 and 13 above mentioned a single port is provided and the ducts 14 and 15 of the above mentioned form are replaced by ducts in the piston 1. To show said ducts the piston has been shown in section in Fig. 2. When the pistons 1 and 2 come to the end of their outward stroke as shown, the mixed carbureted air and fresh air are compressed in the combustion chamber of the

cylinders and the fresh air has just been drawn behind the piston 2 into the right hand part of the crank case through the port 16 which is connected with the atmosphere. Said fresh air aspiration behind piston 2 is due as previously stated to the vacuum produced behind the piston during its outward stroke. Again in the left hand part of the crank case, the piston 1 which has produced the vacuum during its outward stroke uncovers at the end of said stroke the admission port 17 of carbureted air which then comes into said part of the crank case. The explosion being produced, the pistons begin their inward stroke, the piston 2 closes the port 16 and compresses the air in the right hand part of the crank case, whereas the piston 1 compresses the carbureted air in the left hand part. Like in the example before described the ports 16 and 17 are of course uncovered and closed together. On arriving at the end of the stroke the piston 2 uncovers the port 16 which connects the cylinders with the discharge. Immediately afterward the piston 1 connects the right hand part of the crank case with the head of the cylinder 4 by means of a duct 18 in the piston coming opposite the end of a duct 19 in the middle wall of the cylinders. The fresh air compressed in said part, passes thus through the ducts 19 and 18 and sweeps the burnt gases in the cylinders 4 and 5 through the port 16. Lastly the piston 1 connects the left hand part of the crank case with the head of the cylinder 4 by a duct 20 in the piston coming opposite a duct 21 in the outer wall of the cylinder 4 and connected with said part of the crank case. The carbureted air under pressure in said part thus passes through the ducts 21 and 20 before the piston 1 and is there mixed with the air that still flows through the ducts 19 and 18. Immediately afterward, the pistons begin their forward stroke and compress the mixed fuel into the cylinders, the port 16 being closed by the piston 2. Little before coming to the end of the stroke the ports 17 and 16 are uncovered by the pistons, air being drawn into the right hand part and carbureted air into the left hand part of the crank case and so on.

The invention is not limited to the forms shown but may be varied in several ways. It may be very advantageously applied to rotative cylinder motors for example.

Claims:

1. An explosion engine comprising twin cylinders, pistons therein, a closed crank case having a chamber beneath each cylinder, one of said cylinders having an inlet port controlled by its piston, the other cylinder having a fuel inlet port controlled by its piston and a conduit leading from each of said crank chambers to the last named

cylinder, terminating in different longitudinal positions and controlled by the last named piston.

2. An explosion engine comprising twin cylinders, pistons therein, a closed crank case having a chamber beneath each cylinder, one of said cylinders having an air inlet port controlled by its piston, the other cylinder having a fuel inlet port controlled by its piston and a conduit leading from each of said crank chambers to the last named cylinder terminating in different longitudinal positions and controlled by the last named piston.

3. An explosion engine comprising twin cylinders, pistons therein forming a combustion chamber between the heads of the cylinders and the pistons, a closed crank case having a chamber communicating with each cylinder, means controlled by one of the pistons to admit air into one of the chambers through the cylinder communicating therewith, means controlled by the other piston to admit fuel into the other chamber through the cylinder communicating with the latter, means controlled by the last named piston to permit the passage of air from the air chamber to the combustion chamber, and means controlled by said last named piston to permit the passage of fuel from the fuel chamber to the combustion chamber.

4. An explosion engine comprising twin cylinders pistons therein forming a combustion chamber between the heads of the cylinders and the pistons, a closed crank case having a chamber communicating with each cylinder, means controlled by one of the pistons to admit air into one of the chambers through the cylinder communicating therewith, means controlled by the other piston to admit fuel into the other chamber through the cylinder communicating with the latter, means controlled by the last named piston to permit the passage of air from the air chamber to the combustion chamber, and means controlled by said last named piston to permit the subsequent passage of fuel from the fuel chamber to said combustion chamber.

5. An explosion engine comprising an air cylinder, and a fuel cylinder, pistons therein forming a combustion chamber between the heads of the cylinders and the pistons, a wall between said cylinders, a closed crank case having a chamber communicating with each cylinder, said air cylinder having a port therein, the piston of said cylinder adapted to open and close said port and move the air from the cylinder and compress it in the chamber communicating with the latter, the fuel cylinder having a fuel inlet port, the piston of the fuel cylinder adapted to open and close said fuel port and move the fuel from the fuel cylinder to the

chamber communicating with the latter, an air conduit connecting the air chamber with the fuel cylinder, a fuel conduit connecting the fuel chamber with its cylinder, both of
 5 said conduits controlled by the piston in the fuel cylinder and adapted to communicate with the combustion chamber.

6. An explosion engine comprising an air cylinder and a fuel cylinder, pistons therein
 10 forming a combustion chamber between the heads of the cylinders and the pistons, a wall between said cylinders, a closed crank case having a chamber communicating with each cylinder, said air cylinder having a
 15 valveless port therein, the piston of said cylinder adapted to open and close said port and move the air from the cylinder and compress it in the chamber communicating with the latter, the fuel cylinder having a valveless
 20 fuel inlet port, the piston of the fuel cylinder adapted to open and close said fuel port and move the fuel from the fuel cylinder to the chamber communicating with the latter, an air conduit connecting the air
 25 chamber with the fuel cylinder, a fuel conduit connecting the fuel chamber with the cylinder and opening into the latter in advance of the air conduit, both of said conduits controlled by the piston in the fuel
 30 cylinder and adapted to communicate with the combustion chamber.

7. An explosion engine comprising an air cylinder and a fuel cylinder, pistons therein forming a combustion chamber between the
 35 heads of the cylinders and the pistons, a wall between said cylinders, a closed crank case having a chamber communicating with each cylinder, said air cylinder having a valveless port therein, the piston of said
 40 cylinder adapted to open and close said port and move the air from the cylinder and compress it in the chamber communicating with the latter, the fuel cylinder having a valveless fuel inlet port, the piston of the
 45 fuel cylinder adapted to open and close said fuel port and move the fuel from the fuel cylinder to the chamber communicating

with the latter, an air conduit connecting the air chamber with the fuel cylinder, a fuel conduit connecting the fuel chamber
 50 with the cylinder and opening into the latter in advance of the air conduit, both of said conduits controlled by the piston in the fuel cylinder and adapted to communicate with the combustion chamber through
 55 conduits in the last named piston.

8. An explosion engine comprising an air cylinder and a fuel cylinder, pistons therein forming a combustion chamber between the
 heads of the cylinders and the pistons, a
 60 wall between the said cylinders, a closed crank case having a chamber communicating with each cylinder, said air cylinder having a valveless port therein, the piston of said cylinder adapted to open and close said
 65 port and move the air from the cylinder and compress it in the chamber communicating with the latter, the fuel cylinder having a valveless fuel inlet port, the piston of the fuel cylinder adapted to open and close said
 70 fuel port and move the fuel from the fuel cylinder to the chamber communicating with the latter, an air conduit connecting the air chamber with the fuel cylinder, a fuel conduit connecting the fuel chamber
 75 with the cylinder and opening into the latter in advance of the air conduit, both of said conduits controlled by the piston in the fuel cylinder and adapted to communicate with the combustion chamber through con-
 80 duits in the last named piston, said air cylinder having a port controlled by the piston of the latter to exhaust said air chamber prior to the admission of fuel into the combustion chamber.
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In testimony that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

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Witnesses:

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