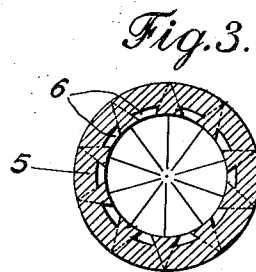
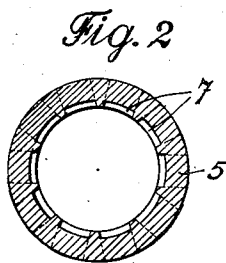
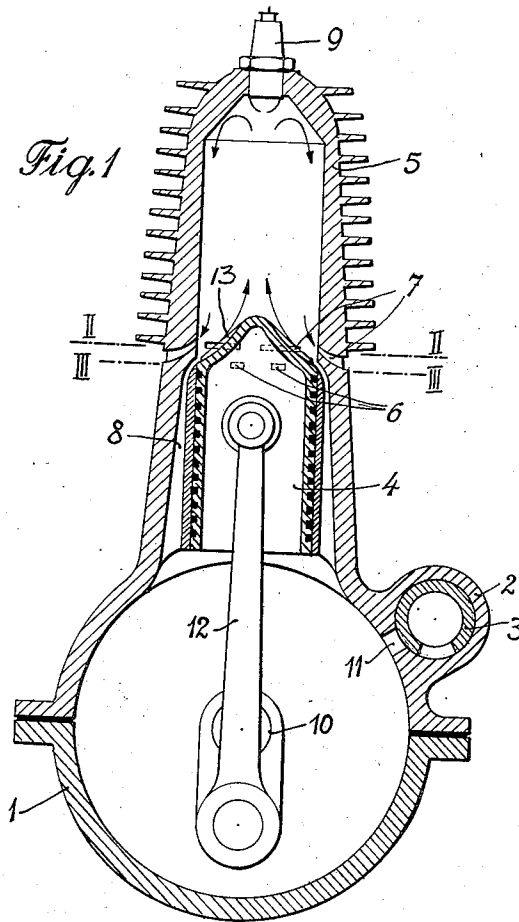


A. M. IMHOFF.
TWO-STROKE INTERNAL COMBUSTION ENGINE.
APPLICATION FILED MAR. 26, 1918.

1,374,573.

Patented Apr. 12, 1921.



Inventor

August Max Imhoff
by *Attorney*
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UNITED STATES PATENT OFFICE.

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TWO-STROKE INTERNAL-COMBUSTION ENGINE.

1,374,573.

Specification of Letters Patent.

Patented Apr. 12, 1921.

Application filed March 26, 1918. Serial No. 224,706.

To all whom it may concern:

Be it known that I, AUGUST MAX IMHOFF, a citizen of the Swiss Confederation, and residing at Berne, Switzerland, have invented a certain new and useful Improved Two-Stroke Internal-Combustion Engine, of which the following is a specification.

The present invention relates to improvements in two cycle explosion engines of the type in which the fuel is subjected to preliminary compression in the crank casing, and in which engines the control of the inlet and exhaust is effected by a valveless piston having a centrally raised head. The piston is provided throughout its extent with piston rings, and in the cylinder wall are two superimposed series of ports, one series of ports serving for the admission of the fuel charge and the other for the exhaust. It has been demonstrated by experience that to secure maximum operating efficiency of the motor, it is important that the entering fuel be directed without shock, into a central axial column flowing toward the cylinder head. One of the means suggested for accomplishing this purpose consisted in imparting an inwardly extending curvature to the centrally raised piston head. Despite the adoption of this expedient the streams of gases impact against each other over the middle of the piston head to such an extent as to cause disturbing eddies.

The principal object of the present invention is to obviate the disturbing condition above pointed out, and to accomplish this object I provide the piston head with radial ribs which register with the intact portions of the cylinder between the admission ports, when the piston is in a position to admit fuel to the cylinder. By means of these ribs the fuel issuing through the inlet ports is directed inwardly in the form of streams, without the streams at first coming into contact with each other. Gradually these streams are so deflected that when they issue from the spaces between the ribs they follow parallel paths and thus do not impact against each other. It is desirable, in this connection, to incline the lateral walls of the inlet ports in the direction of the cylinder bore at a greater angle to each other than the radial ribs of the piston head, so that the entering streams of fuel do not im-

pinge against these ribs but are free to flow between the same.

An embodiment of the invention is illustratively exemplified in the accompanying drawing, in which—

Figure 1 is a vertical sectional view through my improved engine;

Figs. 2 and 3, are transverse sectional views on the lines II—II and III—III, respectively, of Fig. 1.

Mounted on the two part completely closed crank casing 1 is the cylinder 5. In a cylindrical extension 2 of the crank casing is a slide valve 3 which is positively driven by suitable means (not shown) from the crank shaft 10, and communicates with a carbureter (not shown) and also through the duct 11 with the interior of the crank casing 1, which serves for the preliminary compression of the charge. The crank shaft is driven from the piston 4, reciprocable in the cylinder 5, by means of the pitman 12. The entire periphery of the piston is provided with piston rings, and its head is raised at the center and provided with an inwardly directed curvature or depression. Extending entirely about the inner periphery of the wall of the cylinder 5 are two series of ports 6 and 7. The ports 6 communicate with the crank casing through an annular passage 8 formed in the lower part of the cylinder.

Projecting from the piston head beyond the curvature thereof are ribs 13 extending radially of the axis of the cylinder. When the piston is in its lower dead-point position these ribs register with the intact portions between the admission ports 6. These intact portions gradually decrease in width outwardly. As a result of this construction the eddies rushing into the cylinder during the inflow of the charge are so guided that they pass between two adjacent ribs of the piston without impinging against the piston, thereby preventing disturbance in the flow of the charge which might result if the gas contacted frictionally with the ribs. The fresh gases are completely deflected into an axial direction between the ribs so that when the individual streams of gas issue from the spaces between the ribs they do not meet in a manner to cause disturbance of operation. It is obvious that in this manner

eddyding can be absolutely avoided. The fresh gases then move upwardly in the middle of the cylinder against the head thereof, whence they are caused to move downwardly along the cylinder wall.

5 The exhaust gases are conducted through the fresh gases to the ports 7 and are exhausted out of the cylinder therethrough. The intact portions between the exhaust
10 ports become narrower toward the interior of the cylinder (the reverse of the intact portions between the inlet ports 6) in order that the entrance of the exhaust gases into the ports 7 may occur without eddy forma-
15 tion. The exhaust ports 7 widen outwardly in the vertical direction and are arranged in a curve such that the direction of motion of the exhaust gases toward the ports 7, partly determined by the piston head, is
20 preserved in the ports 7. Between the series of admission ports 6 and exhaust ports 7 the cylinder wall presents a small intact area extending entirely around the cylinder wall.

25 The spaces between the piston rings on the outer face of the piston are so small that there is always at least one piston ring on the intact area between the ports 6 and

7, except during the period of inflow of the fresh gas.

30

What I claim is:—

A two cycle engine, comprising a crank casing wherein fuel is compressed, a cylinder carried by said casing and having a series of fuel inlet ports each of which de-
35 creases in width toward the interior of the cylinder whereby intact parts of relatively substantial area are present between adjacent inlet ports, and a piston reciprocable in said cylinder, said piston having its head
40 depressed and a plurality of spaced radial ribs extending from the piston head, whereby when said piston is in position to admit fuel to the cylinder the ribs will aline with the intact parts between the inlet ports and
45 the spaces between the ribs will aline with said inlet ports so that the fuel will enter the said cylinder in substantially parallel streams without the formation of eddies.

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

50

AUGUST MAX IMHOFF.

Witnesses:

FRIEDRICH NAEGELI,
FRIEDRICH MONING.