Sept. 24, 1940. G. EICHELBERG 2,215,579

CYLINDER HEAD FOR FOUR-STROKE INTERNAL COMBUSTION ENGINES

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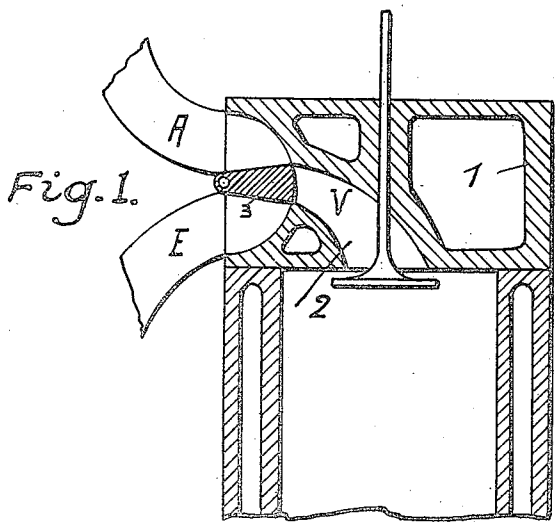
Fig. 1.



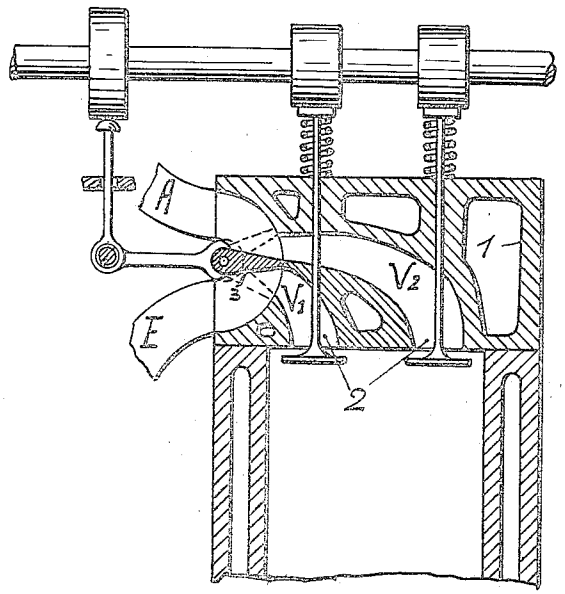


Fig. 2.

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CYLINDER HEAD FOR FOUR-STROKE INTERNAL COMBUSTION ENGINES

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In Germany November 20, 1937

1 Claim. (Cl. 123—76)

My invention relates to improvements in cylinder heads for four-stroke internal combustion engines comprising two or respectively more valves with valve channels separated from each other or respectively sub-divided into two groups, and a control flap, the whole in such a combination that the latter in succession first connects both valve channels or groups of valve channels with the discharge port, then the one valve channel with the discharge port and the other valve channel with the inlet port, and finally both valve channels with the inlet port; and the objects of my improvement are, first, to afford facilities for the complete removal of residual gases; second to make provision for scavenging; and, third, to make use of the cross-sectional area of all valves for the intake stroke as well as for the discharge stroke.

I attain these objects by the mechanism illustrated in the accompanying drawing, in which—

Fig. 1 shows a cylinder head of known type and character; and Fig. 2, a cylinder head according to my present invention.

From Fig. 1 we may take that the known type of cylinder head 1 comprises only one valve V and a channel 2. The controllable element 3 either connects the cylinder with the discharge pipe A or with the inlet port E. It is obvious that all gases yet remaining in the channel 2 again are drawn into the combustion chamber upon a succeeding suction stroke. This is caused by the fact that at the beginning of the exhaust stroke the cylinder is connected with the discharge pipe A and the upwardly moving piston removes the exhaust gases; the element 3 interrupts the connection between the cylinder and the discharge pipe at the time when the cylinder is approximately in its upper dead end position. However, exhaust gases still remain in the channel 2 and in the compression chamber of the piston. These gases are drawn in with the fresh gas at the beginning of the suction stroke when the cylinder is connected with the inlet port E. The cylinder head of Fig. 2 according to my present invention, however, comprises two channels 2. The latter lead to a controllable element 3 which, in accordance with its position, connects the cylinder either with the inlet port E or respectively the discharge port A by way of both the channels 2 or, on the other hand and as shown in the drawing, with both the inlet port and the discharge port. In this construction a complete removal of the gases yet remaining in the channels 2 as well as a scavenging of the latter is made possible, since the exhaust gases are first removed through the ports of the two valves V_1 and V_2 to the discharge port A. However, the element 3 can be moved to the position shown in Fig. 2 even before the completion of the exhaust gas removal. In this position, the withdrawal of the exhaust gases through the port of the valve V_2 continues, while fresh gas or air is supplied to the cylinder through the inlet port E and the port of the valve V_1. Obviously, this air or fresh gas flows through the cylinder and also through the port of the valve V_2 and removes the exhaust gases completely through the port of the valve V_2 and the discharge port A. Finally, after the complete removal of the exhaust gases, the element 3 is moved into the upper broken-line position, so that fresh gas may flow through the ports 2 of the two valves V_1 and V_2 and fill the cylinder completely.

It is known to use in four-stroke engines a common valve for both the inlet port and the outlet port, and alternatingly to connect the valve channel with the said ports by means of a flap. In such a disposition, however, there remains a certain amount of residual gas in the valve channel between valve and flap which afterwards is sucked into the combustion chamber and adulterates the succeeding fresh charge. Such a disposition, furthermore, cannot be employed when the combustion chamber has to be scavenged by fresh air, as e. g., when charging by means of a waste gas turbine and scavenging by means of a blower and by simultaneously keeping open both the inlet valve and the discharge valve.

What I claim and desire to secure by Letters Patent is:

A cylinder head for four-stroke internal combustion engines of the class described comprising two or more valves, a corresponding number of valve channels separated from each other or respectively subdivided into two groups, and a control flap; the whole in such combination that the said flap first connects both valve channels with the discharge port, then the one valve channel with the discharge port and the other valve channel with the inlet port, and finally both valve channels with the inlet port.

GUSTAV EICHELBERG.