

Aug. 14, 1956

E. FLATZ ET AL

2,758,581

AIR COOLED TWO STROKE CYCLE INTERNAL COMBUSTION ENGINE

Filed Aug. 4, 1953

2 Sheets-Sheet 1

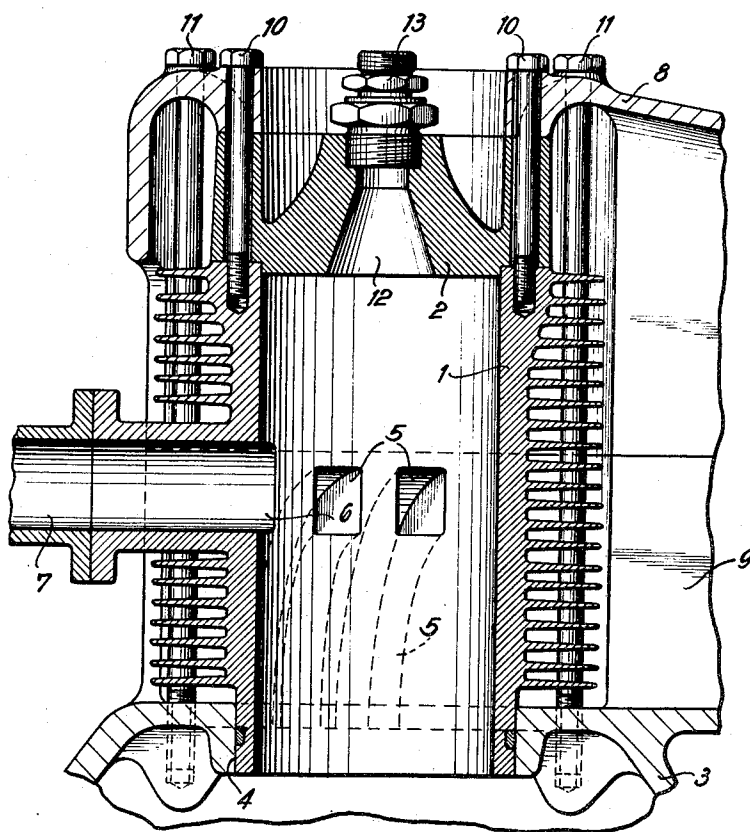


Fig. 1.

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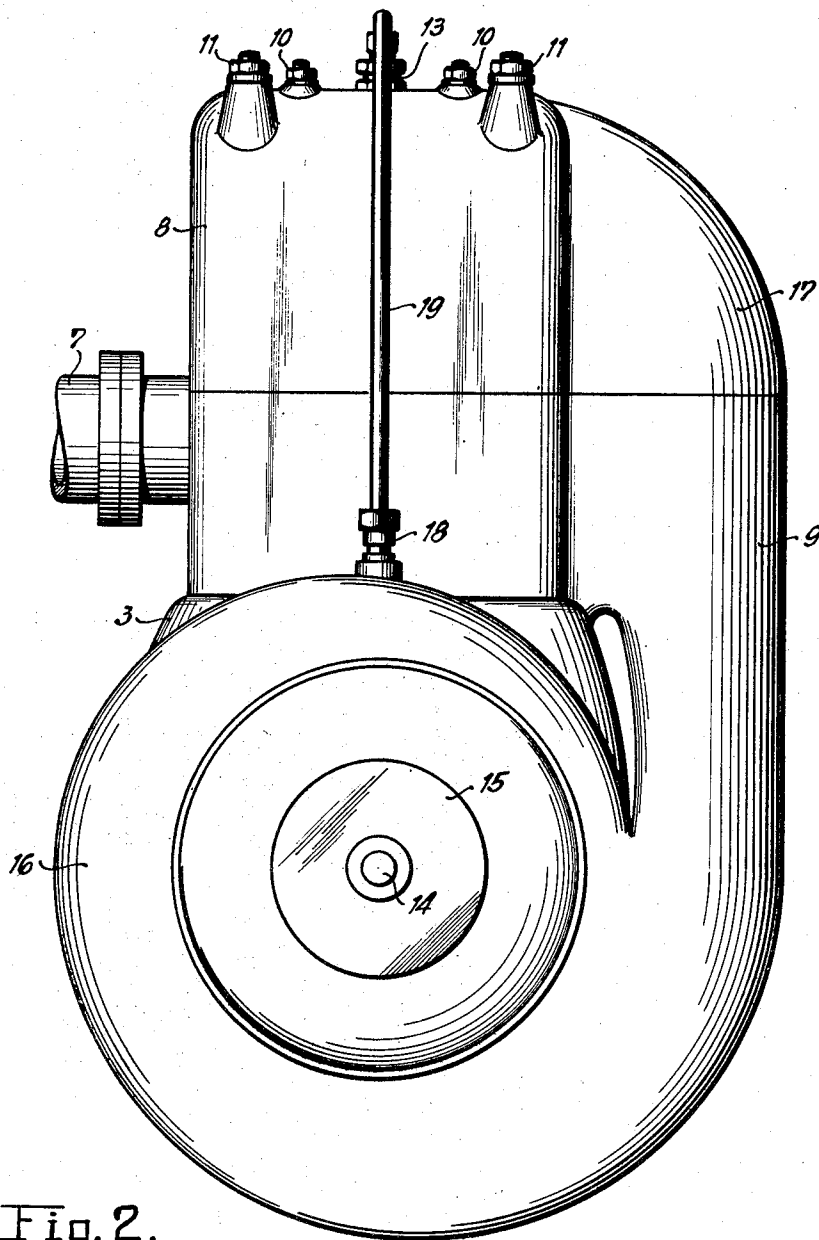


Fig. 2.

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AIR COOLED TWO STROKE CYCLE INTERNAL COMBUSTION ENGINE

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Application August 4, 1953, Serial No. 372,355

Claims priority, application Germany October 11, 1952

2 Claims. (Cl. 123—41.67)

The present invention relates to internal combustion engines and, more particularly, to air-cooled port-controlled two stroke cycle internal combustion engines which include an assembly or structural unit comprising a cylinder and cylinder-head adapted to be displaceable in longitudinal direction of said cylinder, while the discharge conduit is directly connected to the cylinder.

It is an object of the present invention so to improve internal combustion engines of the above type that the assembly or structural unit comprising a cylinder and cylinder-head can easily be removed from and reinstalled in the engine structure.

It is another object of this invention so to design an internal combustion engine of the above type that it will be possible to cast that part, which holds the said assembly or structural unit in suspended position, without the employment of cores.

It is still another object of this invention so to design an internal combustion engine of the type set forth in the preceding paragraph that along the joint line at which said part meets with the portion of the engine supporting said part, the inner spaces or chambers of the said part are open so that said part can be cast in an iron mold without the employment of cores.

These and other objects and advantages of the invention will appear more clearly from the following specification, in connection with the accompanying drawing, in which: Fig. 1 represents a vertical section through a cylinder-cylinder head assembly suspended in conformity with the present invention.

Fig. 2 illustrates the cylinder-cylinder head assembly of Fig. 1 as seen from one end thereof, namely the blower end.

General arrangement

According to the present invention, the assembly unit or structural unit comprising the cylinder and cylinder head is suspended on a hood surrounding the said unit and adapted to guide cooling air around said unit. The said hood is mounted on a portion of the engine casing, which portion likewise serves to guide cooling air around said cylinder. Preferably, the line of division between said portion of the engine block and said hood is located at the level of the discharge conduit means. This arrangement makes it possible to insert into the engine the said structural unit together with the upper portion of the guide for the cooling air, and similarly, makes it possible to remove said unit and guide for the cooling air in the reverse manner. Furthermore, the design according to the present invention allows casting of the guiding hood for the cooling air in an iron mold without the employment of cores while simultaneously simplifying the casting of the engine block.

For the sake of completeness, it may be mentioned that it is known in connection with port controlled two-stroke cycle internal combustion engines to suspend a cylinder-cylinder head assembly on supports or rods so as to allow the cylinder freely to expand downwardly. Furthermore, in connection with four-stroke cycle internal com-

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bustion engines it is known to extend the framework of the engine up to the lower end of the cylinder head so that the cylinder head can rest on the engine framework while the cylinder is freely displaceable in said framework in longitudinal direction of said cylinder. The upwardly extended portion of the framework of said engine serves to guide the cooling air.

Structural arrangement

Referring now to the drawing in detail, the structure shown therein comprises a cylinder 1 and a cylinder-head 2, which two parts represent an assembly unit. The reference numeral 3 designates the crankcase of which only the upper portion is shown in the drawing. The crankcase 3 is provided with a bore 4 in which the cylinder 1 is longitudinally displaceable. The cylinder 1 is provided with inlet or scavenging ports 5 which through passages 5a communicate with the crankcase 3. In the particular structure shown by way of example in the drawing, the crankcase 3 simultaneously serves as scavenging air collector.

The cylinder 1 is furthermore provided with discharge passage means 6 directly connected to the discharge conduit 7.

The cylinder and the cylinder-head are surrounded by guiding means for guiding cooling air around said cylinder-cylinder head unit. This guiding means comprises an upper portion in form of a hood 8 from which is suspended the cylinder 1 and the cylinder-head 2. The lower portion of the guiding means for the cooling air is formed by a part 9 of the engine block. It is this part on which the hood 8 rests. The line of division between the hood 8 and the part 9 is preferably located at the level of the discharge passage means 6. The suspension of the cylinder and the cylinder-head from the hood 8 is effected by means of screws 10 which interconnect said cylinder and said cylinder-head. The hood itself is connected to the crank casing 3 by means of screws 11 which extend from the uppermost end of said hood into the crank case 3. These screws or bolts 11 take up the pulling forces caused by the combustion and convey these forces to the walls of the crank case. Therefore, the long screws or bolts 11 make it possible to design the guiding means for the cooling air with relatively thin walls. If the screws or bolts 11 were not provided, the pulling forces would have to be taken up by the walls of the guiding means for the cooling air, which in such instance would have to have rather thick walls.

The two-stroke cycle internal combustion engine shown in the drawing has a cone-shaped combustion chamber 12 provided in the cylinder-head 2. The fuel injection nozzle 13 discharges from the top into said combustion chamber 12.

For a better understanding of part 9 of the engine block, reference may be had to Fig. 2 showing the engine of Fig. 1 as seen from the blower side. The opposite end of the engine, which is not visible in the drawing, represents the fly-wheel end of the engine. On the blower end of the engine there is arranged the blower for the cooling of the engine, said blower being connected to the front end of the crank shaft 14. The hub of the rotor of the blower is designated with the reference numeral 15. The rotor of the blower is surrounded by a spiral casing 16 which is connected with the crank case 3 of the engine. As will be clear from the drawing, a pressure connection 9 leads upwardly from said spiral casing 16 and is supplemented by a portion 17 of the hood 8 so as to form therewith a complete conduit for passing cooling air to the cylinder 1. A fuel injection pump 18 is arranged between the cooling blower and the engine and is connected with the fuel injection nozzle 13 through the pressure conduit 19. The screw bolts 10 and 11 referred to

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above in connection with Fig. 1 and the exhaust manifold 7 are also visible in Fig. 2.

It is, of course, understood that the present invention is, by no means, limited to the particular construction shown in the drawing, but also comprises any modifications within the scope of the appended claims.

What we claim is:

1. In an air cooled port controlled two-stroke cycle internal combustion engine, which includes a cylinder-cylinder head assembly the cylinder of which has discharge passage means for direct connection with an exhaust manifold, while said assembly is insertable in axial direction thereof as a unit into said engine, the combination of: an engine block including channel means forming part of said engine block and arranged to pass cooling air around said cylinder-cylinder head assembly, hood means surrounding said cylinder-cylinder head assembly in spaced relationship thereto and arranged in cooperation with said channel means to guide cooling air around said cylinder-cylinder head assembly, said hood means resting on said channel means along a plane located substantially within the range of said discharge passage means, and suspending means detachably connecting said assembly on said hood means.

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2. In an air cooled port controlled two-stroke cycle internal combustion engine, which includes a crank case and a cylinder-cylinder head assembly adapted in axial direction thereof as a unit to be displaced in said engine, and in which said cylinder has discharge passage means for direct connection with an exhaust manifold, the combination of: an engine block including channel means arranged to guide cooling air around said cylinder-cylinder head assembly, hood means surrounding said cylinder-cylinder head assembly in spaced relationship thereto and arranged in cooperation with said channel means to guide cooling air around said cylinder-cylinder head assembly, said hood means resting on said channel means along a plane located within the range of said discharge passage means, first connecting means suspending said assembly from said hood means while the lower portion of said cylinder displaceably extends into said crank case, and second connecting means extending from the uppermost portion of said hood means into said crank case and connecting said hood means thereto.

References Cited in the file of this patent

UNITED STATES PATENTS

2,638,081 Spannhake ----- May 12, 1953