

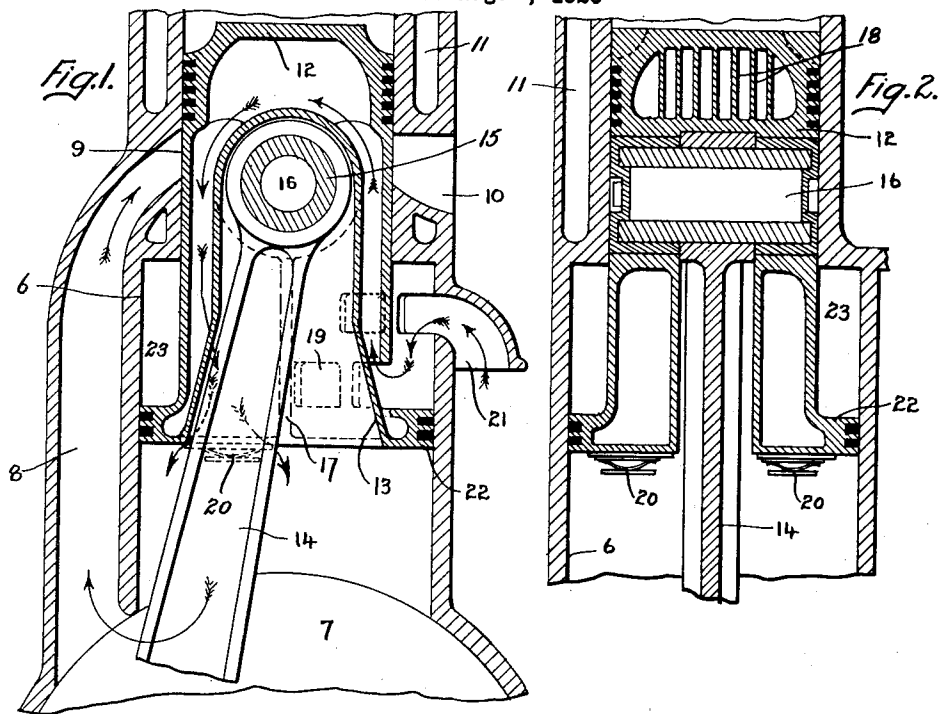
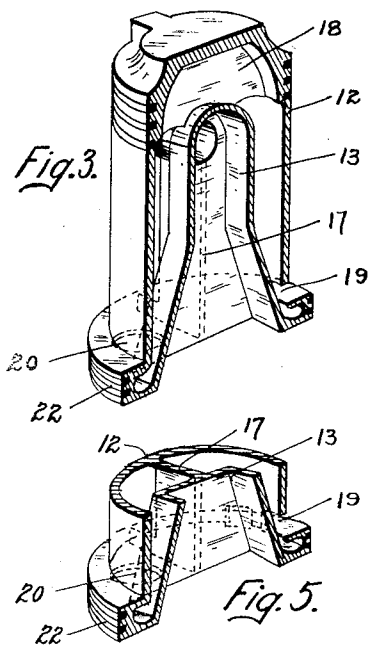
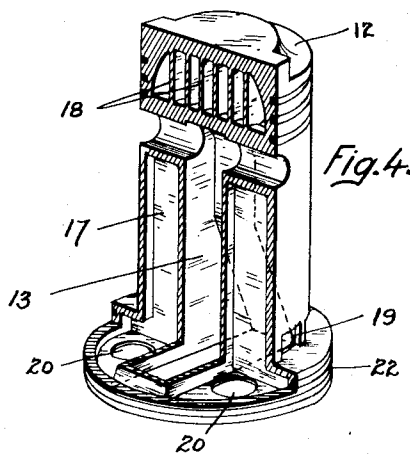
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PISTON

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UNITED STATES PATENT OFFICE.

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PISTON.

Application filed August 3, 1926, Serial No. 126,829, and in Australia August 28, 1925.

This invention relates to the cooling of the pistons in internal combustion engines by passing air therethrough.

It is known in internal combustion engines to pass atmospheric air or air from a receiver across the space formed between the underside of the piston and an extension thereof which acts as a guide to which the gudgeon pin is secured. Further, a two stroke cycle internal combustion engine having a stepped piston has been proposed in which air is drawn into and expelled from the space formed between the larger diameter of the cylinder and the smaller diameter of the piston during its outward and inward strokes.

The present invention consists in an internal combustion engine having a stepped cylinder, in which the stepped piston is formed as a double hollow casing that connects the space by means of a valve or valves with the crank chamber by which the induction air is passed to cool the piston.

The invention is further characterized by the provision of an internal dividing wall, transverse fins above the said wall, and by ports in the wall of the piston on one side of the dividing wall and valves in the base of the piston on the other side thereof.

The invention will now be described with reference to the accompanying drawings which illustrate a piston constructed according to the invention and applied to an internal combustion engine operating on the two cycle principle.

Figure 1 is a sectional elevation of the piston and part of the cylinder,

Figure 2 is a section at right angles to that shown in Figure 1,

Figure 3 is a sectional perspective view of the piston on the plane shown in Figure 1,

Figure 4 is a sectional perspective view of the piston on the plane shown in Figure 2, and

Figure 5 is a sectional perspective view of the lower part of the piston.

The tandem stepped cylinder 6 and crankcase 7 are of well known construction and design and have the usual scavenging and combustion air passage 8 and ports 9 exhaust ports 10 and water jacket 11.

The piston 12 is stepped and hollow and is provided with a central air tight pocket 13

for the reception of the connecting rod 14 and its little end 15, in which the gudgeon pin 16 and any well known system of brasses and distance pieces are fitted.

The piston is also provided with a central dividing wall 17 and at right angles to this a number of parallel cooling fins 18 and on one side of the wall 17 near its lower end a number of inlet ports 19. On the other side of the wall 17 and in its base it has a pair of valves 20 of any well known automatic type. The induction air is admitted through ports 21 in the enlarged part of the cylinder which are so situated that when the piston is at the top of its stroke they are uncovered by the lower flange 22.

The course of the incoming air when the piston is moving upwards thus creating a partial vacuum in the crankcase is as follows:—

Through the inlet ports 21 to the space 23 and through the ports 19 to the interior of the piston on one side of the wall 17 and then upwards past the fins 18 and down the interior of the piston on the other side of the wall 17 to the crankcase 7 through the valves 20 which automatically open.

When the flange 22 rises sufficiently far the ports 21 become uncovered and air is admitted direct to the crankcase.

On the return stroke of the piston, the valves 20 close and the air is compressed in the crankcase and afterwards admitted to the cylinder 6 in the usual manner when the port 9 becomes uncovered.

When the piston is used in an engine working on the four cycle principle the heated air from the crankcase may be led to the cylinder air induction pipes, suitable and well known non-return valves being placed therein and, if required, at the entrance to the ports 21.

In four cycle engines the flow of the air may be reversed by reversing the direction of opening of the valves 20, putting a check valve on the air opening to the crankcase and taking the heated air from the ports 21 to the induction pipe.

The construction may also be applied to air compressors for the purpose of cooling the piston.

I claim:

1. In an internal combustion engine, a

stepped cylinder, a hollow stepped piston therein, a centrally situated dividing wall in said piston, air inlet ports in the piston walls on one side of said dividing wall, outlet valves in the base of the piston on the other side of said wall and air inlet ports in the enlarged part of said stepped cylinder.

2. In an internal combustion engine, a stepped cylinder, a stepped hollow piston therein, a pocket in said piston for receiving the connecting rod of the engine, a central internal dividing wall in said piston, transverse fins above said wall, inlet ports in the wall of the piston on one side of said dividing wall, outlet valves in the base of said piston on the other side of said dividing wall and inlet ports in the enlarged part of said cylinder.

3. In an internal combustion engine, a stepped cylinder, a stepped piston therein formed as a double hollow casing, the space of which communicates with the crank chamber of the engine, and valves in said piston for controlling the passage of induction air through the space so as to cool the piston.

In testimony whereof I have affixed my signature.

GEORGE WENTWORTH GRAYSON.