July 29, 1941. E. C. COWLES 2,250,446

CYLINDER HEAD

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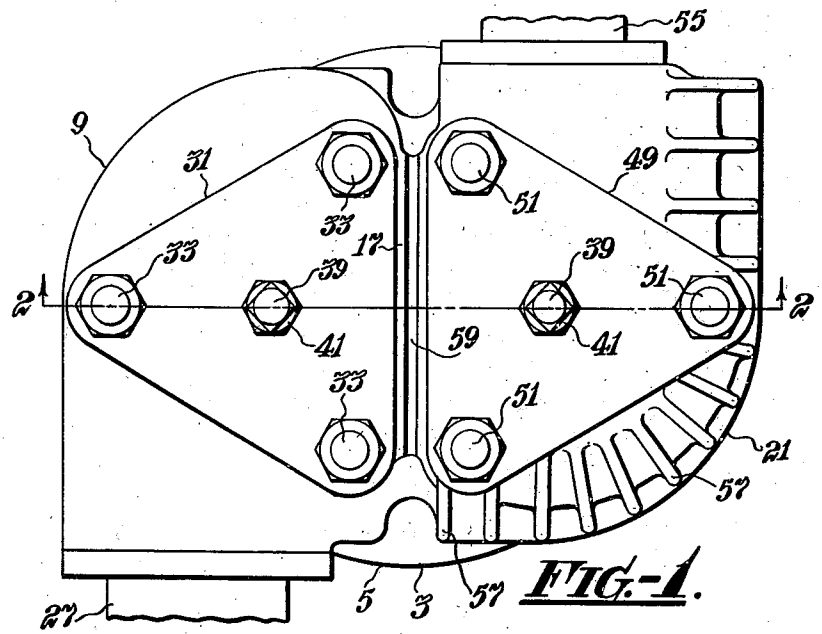


FIG.-1.

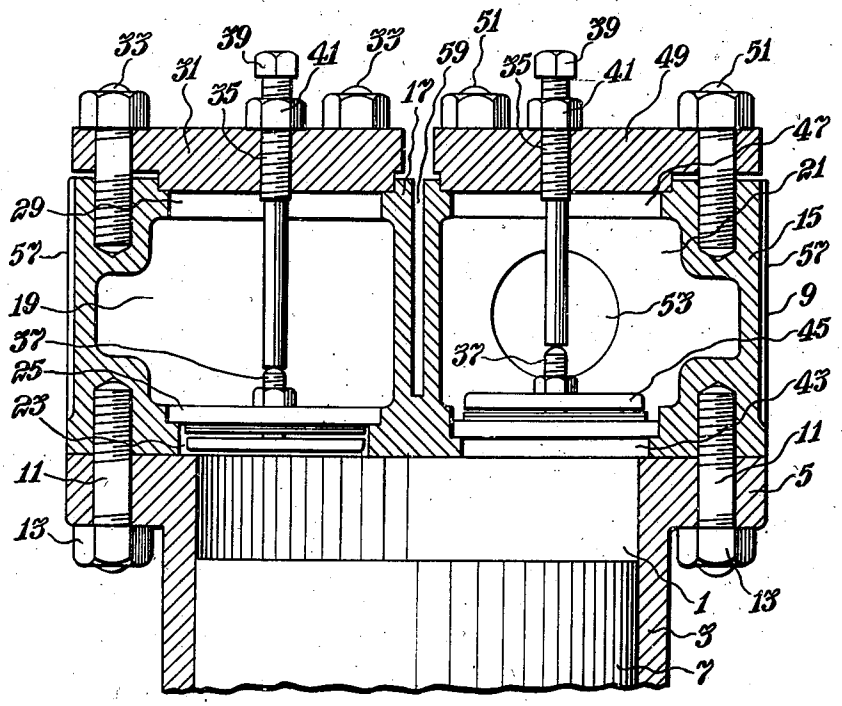


FIG.-2.

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CYLINDER HEAD

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Application June 20, 1939, Serial No. 280,052

1 Claim. (Cl. 230—211)

This invention relates to a cylinder head for a motor and, more particularly, it relates to a means in a unitary cylinder head to prevent the transfer of heat from the fluid being discharged from the motor cylinder to the fluid being admitted thereto.

Whenever a single, or unitary, cylinder head, having an inlet passage or manifold to lead fluids to the motor cylinder, and an outlet, or discharge, passage or manifold, to carry away fluids exhausted by the motor cylinder is employed, there is a transfer of heat from the fluid being exhausted by the motor to the fluid being led to the motor which is very objectionable. The exhausted fluids leaving the motor cylinder are generally very hot and for efficient operation of the motor, it is important that the fluids entering the motor be maintained at normal temperatures.

It is, accordingly, an object of the present invention to porvide a unitary cylinder head containing an inlet and outlet manifold wherein the inlet manifold may be cooled.

Another object is to provide a unitary cylinder head containing an inlet and outlet manifold wherein the outlet manifold is insulated from the inlet manifold.

A still further object is to provide a unitary cylinder head containing an inlet and outlet manifold which is simple in construction and very efficient.

These and other objects will be apparent from the following description and drawing wherein the same numbers indicate like parts and in which

Figure 1 is a top elevational view of the cylinder head of the present invention mounted on a cylinder of a fluid compressor,

Figure 2 is a sectional view taken along line 2—2 of Fig. 1.

The motor referred to in this description may be either an internal combustion engine or a fluid compressor. However, for the sake of simplicity, a portion of a cylinder of a fluid compressor has been shown which comprises, as shown in the drawing, a cylinder 1 formed by the walls 3 terminating at the upper end in a flange 5. Within the cylinder wall 3 is a reciprocating piston 7. Mounted on the flange 5 is the cylinder head, generally indicated at 9. The cylinder head 9 is secured to the cylinder wall 3 by any appropriate means such as the stud 11 and nut 13. The wall 15 of the cylinder head 9 extends around the entire cylinder head and a transverse wall is centrally located between the outer wall 15 in order to form an inlet passage or manifold 19 and an outlet passage or manifold 21.

At the bottom of the inlet manifold 19 is a port 23 opening into the cylinder 1. An inlet valve generally indicated at 25 controls the communication through this port. The valve 25 is a plate valve of standard construction and, since it forms no part of the present invention, will not be described herein. The valve is so designed that when the pressure of the fluid in the inlet manifold 19 exceeds the pressure of the fluid in cylinder 1, the valve will open to permit the flow of fluid into the cylinder 1 to thus charge the cylinder. The inlet manifold is subjected to atmospheric pressure through the pipe 27 which opens into the manifold. At the upper portion of the inlet manifold 19 is an aperture 29 through which the valve 25 may be inserted. The cover 31 normally closes the aperture 29 and is securely fastened to the cylinder head 9 by appropriate bolts 33.

In order to hold the valve 25 securely in place, the rod 35 threadedly engages the cover 31 and extends to and bears against the extension 37 on the valve 25. The rod 35 has a square head 39 in order that a wrench may be employed to turn the rod. Once the valve has been secured in position over port 23 by rod 35 the rod must be secured in position and to this end the locking nut 41 is provided.

The outlet or discharge manifold 21, likewise, has a port 43 opening into the cylinder 1. This port is normally covered by the valve 45, of standard construction and similar to valve 25, which is designed to open when the pressure in cylinder 1 exceeds the pressure in the manifold 21 to thus enable fluid to escape from the cylinder 1. The valve 45 is inserted into the outlet manifold through the opening 47 which is closed by the cover 49 secured to the cylinder head 9 by bolts 51.

The valve 45 is secured in place by means which are identical with the means securing valve 25 and, accordingly, this mechanism has been designated by the same numbers as were used in connection with the valve 25.

The outlet manifold 21 has an opening 53 with which the pipe 55, leading to the receiver tank of the compressor (not shown) is connected. With this arrangement, air, for instance, may enter the inlet manifold 19 through pipe 27 and, upon a reduction of pressure in the cylinder 1 by the downward movement of piston 7, the valve 25 will open and admit the air to the cylinder 1. After the piston reaches the lowest point of its

stroke and begins to rise, the pressure in cylinder 1 will increase, thus closing valve 25 and, upon a predetermined pressure in the cylinder, the valve 45 will open to permit the air, which has been compressed by the piston, to escape into the outlet manifold 21 and through the pipe 55.

Obviously, when the air is compressed in the cylinder 1, it is heated and, therefore, the temperature of the fluid entering through valve 25 will be considerably lower than the temperature of the fluid escaping by valve 45. This heat is very objectionable and must be removed without permitting it to raise the temperature of the fluid in entering through the inlet manifold 19. Should the inlet fluid become heated, the efficiency of the compressor would be greatly reduced as is readily apparent.

For this reason, a series of fins 57 are provided around the outlet manifold 21. These fins are of the customary construction employed for air cooling a cylinder and are cast into the cylinder head 9 at spaced intervals. Furthermore, the transverse wall 17 must, in some way, be insulated so that heat may not flow from the outlet manifold 21 to the inlet manifold 19.

To this end an aperture or slot 59 is provided in the wall. This slot may be cast in the wall or may be sawed or milled. The purpose of the slot 59 is to provide an insulation space for air to enter since air can be used to carry away heat by convection.

Although the present invention has been described in connection with a fluid compressor, it is not to be limited to a compressor but may be used with motors of all sorts and the invention should not be limited save as defined in the appended claim.

I claim:

In a unitary air cooled cylinder head, a transverse wall, an inlet manifold having an opening for connection to an inlet conduit at a side of the head substantially perpendicular to the wall and a curved portion of the head facing said opening for the inlet conduit and joining the wall to a side of the head substantially parallel to the wall, a discharge manifold having an opening for a connection to a discharge conduit at a second side of the head substantially perpendicular to the wall and a second curved portion of the head facing said opening for the discharge conduit and joining the wall to a second side of the head substantially parallel to the wall, cooling fins arranged around the part of the head surrounding the discharge manifold including the curved portion facing the opening for the discharge conduit, and an aperture in the wall opening from the top of the head to separate the inlet manifold from the discharge manifold and prevent heat transference therebetween.

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