ABSTRACT

A cylinder head for an internal combustion engine, adapted to fit two or more adjacent cylinders, is provided with, for each cylinder, two spaced apart inlet valves and outlet valves grouped around a central injector. The inlets extend from a first side face of the head, which is provided with a common depression, while the outlets open onto a second side face opposite the first side face. Each of the inlets is provided with a specific configuration such that the flow of gases about each inlet valve is substantially equal. The outlets have a common partition which terminates short of the second side face such that they merge into a single outlet proximate the second side face. Further, the present invention contemplates analogously configured adjacent cylinders.

1 Claim, 2 Drawing Figures
The present invention relates to a cylinder head for an internal combustion engine, and more particularly to a diesel engine.

It is known to provide a cylinder head for a diesel engine with a central housing to receive an injector situated perpendicularly to the joining plane and around which there are arranged four valves, i.e., two inlet and two outlet valves. The inlet valves open onto air inlet conduits which lead to one of the side faces of the cylinder head, while the outlet conduits lead to the opposite side face.

The aim of the present invention is to provide a cylinder head suitable for use with an engine having several cylinders.

The cylinder heads have the advantage of forming units that can be placed next to one another for the manufacture of in-line engines or of V-engines.

Moreover, the invention aims at creating a cylinder head where the flow of gases in the inlet and outlet conduits leads to turbulence in the cylinder resulting in an improvement in engine performance.

According to the present invention there is provided a cylinder head to fit two or more adjacent cylinders of a diesel engine, each cylinder having four valves grouped around a central injector. The head includes inlet conduits which all open on the same side face thereof and outlet conduits which all open on the opposite side face. All the inlet conduits extend from the base of a common depression in the first mentioned side face, one of the conduits associated with each cylinder having a rectilinear section substantially perpendicular to the first mentioned side face and the other inlet conduit of this same cylinder having a rectilinear section which is inclined to this side face. Preferably, the arrangement of the inlet conduits is such that the inclined rectilinear section of the inlet conduit of one cylinder is adjacent and converges towards the rectilinear section of the adjacent cylinder.

Preferably, two exhaust conduits for each cylinder are separated by a partition which terminates short of the said opposite side face of the cylinder head, whereby the two exhaust conduits merge into a single outlet opening at the opposite side face.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view showing in diagrammatic form the lower face of a cylinder head in accordance with the invention, and

FIG. 2 is a section along the line II—II in FIG. 1.

A cylinder head 1 represented in the drawings is designed to fit two adjoining cylinders of a diesel engine. It includes two housings 101 and 201, each adapted to receive, in the usual way an injector. The injector will be situated in the center of its cylinder and perpendicular to the lower plane face 2 of the cylinder head 1.

Four valves, namely two inlet and two exhaust valves, are arranged around the housing 101. The bores to receive the guides of the stems of the inlet valves are designated by the reference numbers 104 and 105. The bores for the guides of the stems of the exhaust valves are designated by the reference numbers 104 and 105. The recesses for the inlet valves open at the plane face 2 onto valve seats 106 and 107, while the recesses for the outlet valves open on to the valve seats 108 and 109.

In the same way there are provided around the housing 201 bores 202 and 203 for the inlet valves, and bores 204 and 205 for the exhaust valves. These bores cooperate with inlet valve seats 206 and 207 and with exhaust valve seats 208 and 209.

It will be noticed that the arrangement of the valves around the housing 201 for the injector of the second cylinder is inferred by transfer from the position of the valves around the housing 101 for the injector of the first cylinder. In other words, in the central area of the cylinder head, the bores 104 and 105 of the exhaust valves of one cylinder are next to the bores 202 and 203 of the inlet valves of the other cylinder.

There will now be described in greater detail, the arrangement of the inlet and outlet conduits for the cylinder associated with the housing 101, it being clearly understood that the arrangement is identical for the inlet and outlet conduits of the other cylinder.

The cylinder head 1 has two opposite side faces 3 and 4. These two faces are planes. All the inlet conduits open onto face 3, while all the outlet conduits open onto face 4.

Flow into the valve of the bore 103, which is the most distant from the face 3 takes place through a conduit having a rectilinear section 110 substantially perpendicular to the face 3 followed by an incurved section 111 which provides a turbulence in the flow of gases around the housing 101 before the gases enter the cylinder. On the other hand, the flow into the valve of the bore 102 takes place through a conduit which offers a first rectilinear section 112 inclined to the face 3 followed by an S-shaped section 113 and which imparts to the gases before entry into the cylinder, a speed of flow corresponding to a turbulence in the same direction as before, turning around the injector of the housing 101.

The arrangement is similar in the case of the other cylinder. Thus the inlet conduit to the valve furthest from face 3 has a rectilinear section 210 perpendicular to face 3, followed by a section shaped in the arc of a circle 211. The flow into the other valve takes place through a rectilinear section 212 inclined to the face 3 followed by an S-shaped section 213.

A depression 5 is provided on face 3 of the cylinder head. This depression 5 serves as an inlet manifold from which lead the four initial sections 110,112,210,212 of the inlet conduits. Thus the four inlet conduits do not open directly onto the face 3 of the cylinder head, but are recessed on the base 6 of the depression 5.

In addition, it can be seen that the rectilinear sections 112 and 210 are adjacent and converge towards the base 6 of the depression 5.

Exhaust takes place below the two valves of the bores 104 and 105, by way of two rectilinear conduits 114 and 115 separated by a partition 116 whose free end is located below the face 4. In other words, the two outlet conduits 114 and 115 of the same cylinder are already merged into a single conduit 118 which extends over a length 117 before it opens on to the face 4. It is therefore the said 103, 104, and 118 which opens onto the exhaust face 4 of the cylinder head.

The arrangement is similar for the other cylinder, with the one difference that the two outlet conduits 214
and 215 are slightly incurved so as to leave room for a drilling 7 to receive one of the bolts which fix the cylinder head onto the engine block. On the other hand, as before, the partition 216 which separates these two conduits 214 and 215 stops short of the face 4 of the cylinder head, so as to leave a length 217 along which the two tubes 214 and 215 are joined into a single outlet conduit 218 which opens onto the face 4. The above is concerned with a cylinder head for two cylinders. It will be realized that the invention is not limited to a head common to two cylinders and that the cylinder head can be extended and applied to more than two cylinders.

I claim:

1. In a diesel engine of the type having a plurality of cylinders each comprising a central injector and two axially spaced apart inlet valves and two axially spaced apart outlet valves, the four valves being grouped around the injector, a cylinder head to fit two or more adjacent cylinders comprising:
   a. for each of the cylinders two inlet conduits, all of the inlet conduits being open to a first side face of the head, the first side face being provided with a common depression having a base, each of the inlet conduits extending from the base of the common depression,
   b. for each of the cylinders two outlet conduits, each being associated with an outlet valve, the conduits opening to a second side face of the head, the second side face being opposite to the first side face, a common partition between the each of the two outlet conduits, the partition terminating short of the second side face such that the two conduits merge into a single conduit proximate the second side face, and wherein
   c. the inlet conduit associated with the inlet valve most distant from the first side face includes a first rectilinear section substantially perpendicular to the first side face and a second curvilinear section which provides turbulence around the housing of the injector, the inlet conduit associated with the inlet valve closest to the first side face has a first rectilinear section inclined to the first side face followed by an S-shaped section such that the flow of gases about each inlet valve of the cylinder is substantially equal and the inlet conduit of the inlet valve closest to the first side face associated with a first cylinder being adjacent to the inlet conduit of the inlet valve most distant from the first side face of a second cylinder, the adjacent inlet conduits converging towards the base of the common depression.

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