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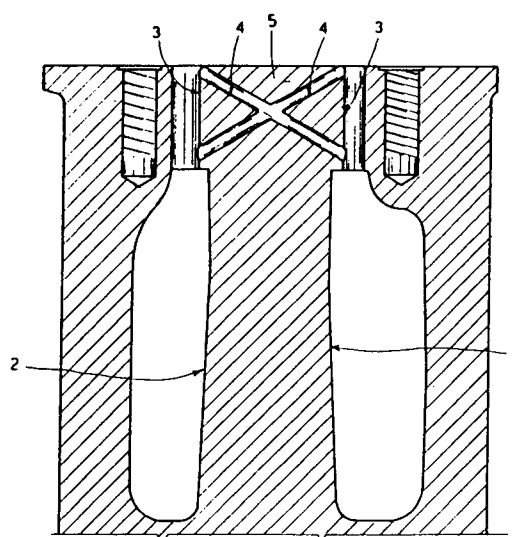
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54 **Perfected internal combustion engine block.**

57 A perfected internal combustion engine block having a coolant circulating circuit comprising a cavity (2) partially surrounding each cylinder; the present invention being characterised by the fact that, in the portion between two adjacent cylinders, there extends, from each of the aforementioned cavities (2), an oblique hole (4) communicating externally and intersecting a similar oblique hole (4) extending from the cavity (2) adjacent to the aforementioned cavity (2).



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PERFECTED INTERNAL COMBUSTION ENGINE BLOCK

The present invention relates to a perfected internal combustion engine block.

5 Smooth operation of the said engines is known to depend on maintaining the engine components subject to most thermal stress at a temperature compatible with the functions performed by such components. This therefore means cooling the engine blocks, in particular, the most critical
10 points on the same, such as the portions between two adjacent cylinders, which, being of very limited thickness, do not allow for sufficient coolant circulation.

At present, a cavity is formed about each cylinder and communicating externally via vertical holes. Inside the
15 portions extending between two adjacent cylinders, provision is made for two such vertical holes, one for each cavity and, therefore, one for each cylinder. On certain types of engine blocks, the cavities of two adjacent cylinders communicate via a third cavity formed by casting;
20 ing; on other types, the vertical holes of two adjacent

cavities communicate via an oblique hole or by removing material off the cylinder head.

The aim of the present invention is to provide a perfected internal combustion engine block enabling improved cooling
5 as compared with known blocks of the aforementioned types. With this aim in view, according to the present invention, there is provided a perfected internal combustion engine block having a coolant circulating circuit comprising a cavity for each cylinder, characterised by the fact that,
10 in the portion between two adjacent cylinders, there extends, from each said cavity, an oblique hole communicating externally and intersecting a corresponding oblique hole extending from the said cavity of the said adjacent cylinder.

15 A preferred embodiment of the present invention will be described by way of example with reference to the accompanying drawings in which :

Fig.1 shows a partial section of an internal combustion engine block;

20 Fig.2 shows an enlarged section of a detail on the Fig.1 block.

Number 1 in Fig.1 indicates a perfected block for known types of internal combustion engines. About each cylinder, there is formed a cavity 2 communicating externally via
25 two vertical holes 3 each formed in the portion of block 1 extending between two adjacent cylinders. According to the present invention, the said holes 3 of adjacent cavities 2 communicate via two oblique, centrally-intersecting holes 4, the said intersection defining, on block 1, a
30 triangular-section portion 5 having its tip situated at

the said point of intersection and the other two tips located at the top ends of two adjacent said holes 3. Cavities 2 and holes 3 and 4 define a circuit in which to circulate coolant, preferably water containing antifreeze and passivators for preventing corrosion. The said circuit forms part of a known type of cooling system which, depending on the type of application, may be a consumption or total/partial feedback type.

By means of a duct (not shown), each cavity 2 is fed, e.g. by means of a pump, with coolant which flows out through holes 3, part of the said coolant flowing into adjacent hole 3 via communicating hole 4. At the said point of intersection, the mean speeds (V_1 and V_2 in Fig.2) of the coolant flowing in holes 4 combine to give a resultant (V_3) directly incident with the tip of portion 5, and the resulting swirl of which provides for improved heat exchange between the coolant and the said portion 5.

The advantages of the engine block according to the present invention will be clear from the foregoing description.

In particular, improved cooling provides for greater reliability of the components subject to overheating in the area in question, i.e. cylinders, pistons, piston rings, etc., thus reducing wear on the said components and, consequently, maintenance cost of the same. Improved engine performance may also be obtained without subjecting the block to critical operating temperatures. Furthermore, the centre distance between the cylinders may also be reduced at the design stage, for so reducing the length of the engine. Finally, block 1 provides for greater cooling

efficiency, as compared with known types of blocks, as well as for lower manufacturing cost, as compared with blocks having a cast connecting cavity between two annular cavities; which solution, despite the improvement it affords in terms of cooling, is complex in design, expensive to manufacture and reduces the rigidity of the block.

To those skilled in the art it will be clear that changes may be made to block 1 as described and illustrated herein without, however, departing from the scope of the present invention.

CLAIMS

- 1) - A perfected internal combustion engine block having a coolant circulating circuit comprising a cavity (2) for each cylinder, characterised by the fact that, in the portion between two adjacent cylinders, there extends, from each said cavity (2), an oblique hole (4) communicating externally and intersecting a corresponding oblique hole (4) extending from the said cavity (2) of the said adjacent cylinder.
- 2) - An engine block as claimed in Claim 1, characterised by the fact that the said oblique holes (4) of the said two adjacent cavities (2) intersect centrally, so as to define, in the said portion extending between two adjacent cylinders, a substantially triangular-section portion (5).
- 3) - An engine block as claimed in Claim 1 or 2, characterised by the fact that, in the said portion extending between two adjacent cylinders, there extends, from each of the said cavities (2), a vertical hole (3).
- 4) - An engine block as claimed in Claim 3, characterised by the fact that each of the said oblique holes (4) extends from a corresponding vertical hole (3), in the proximity of the connecting point between the said vertical hole (3) and the respective said annular cavity (2), and, subsequent to intersecting the corresponding said oblique hole (4), comes out at the top end of the corresponding vertical hole (3) extending from the said cavity (2) adjacent to the aforementioned said cavity (2).

Fig.1

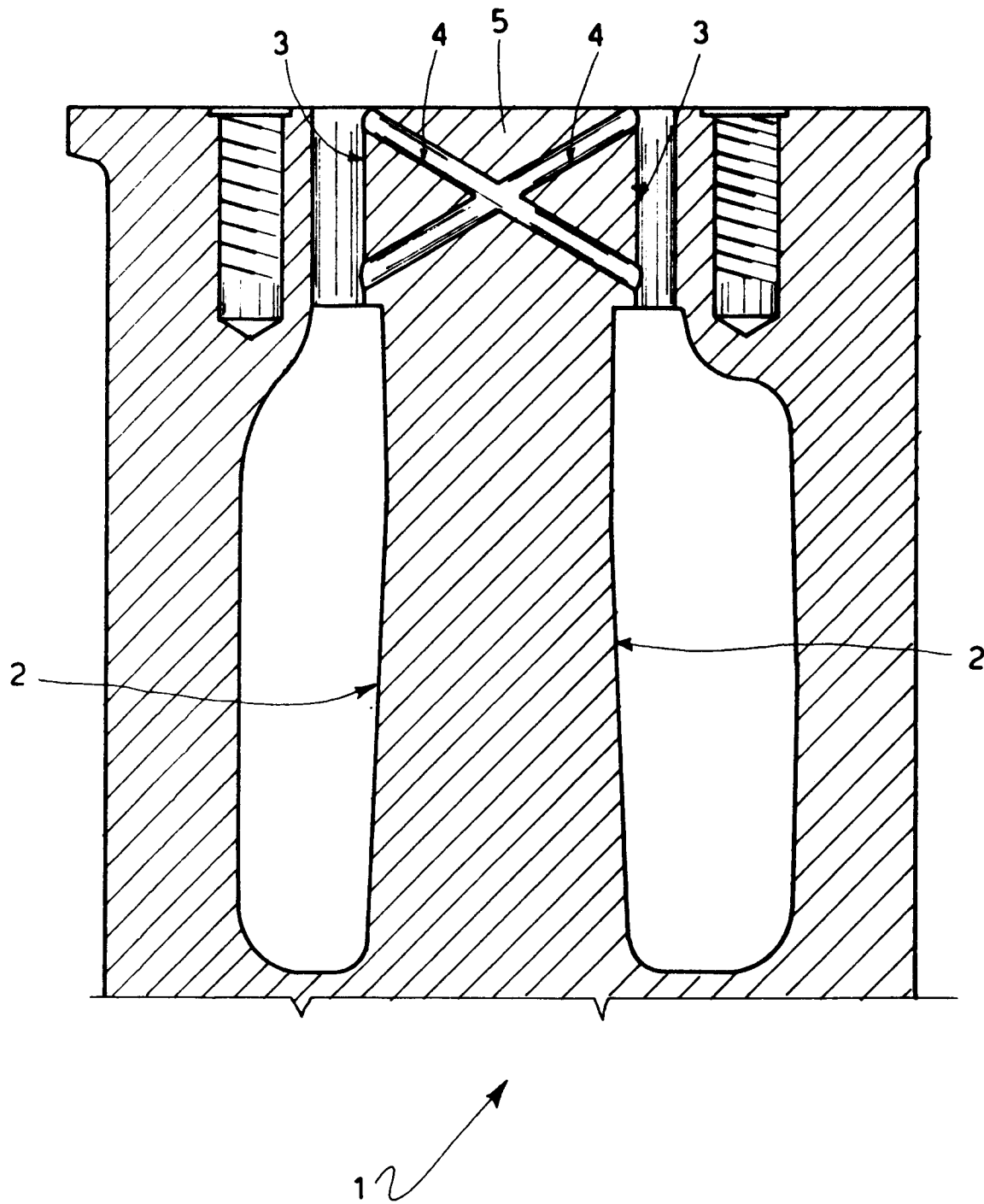
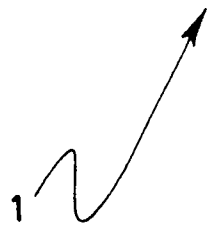
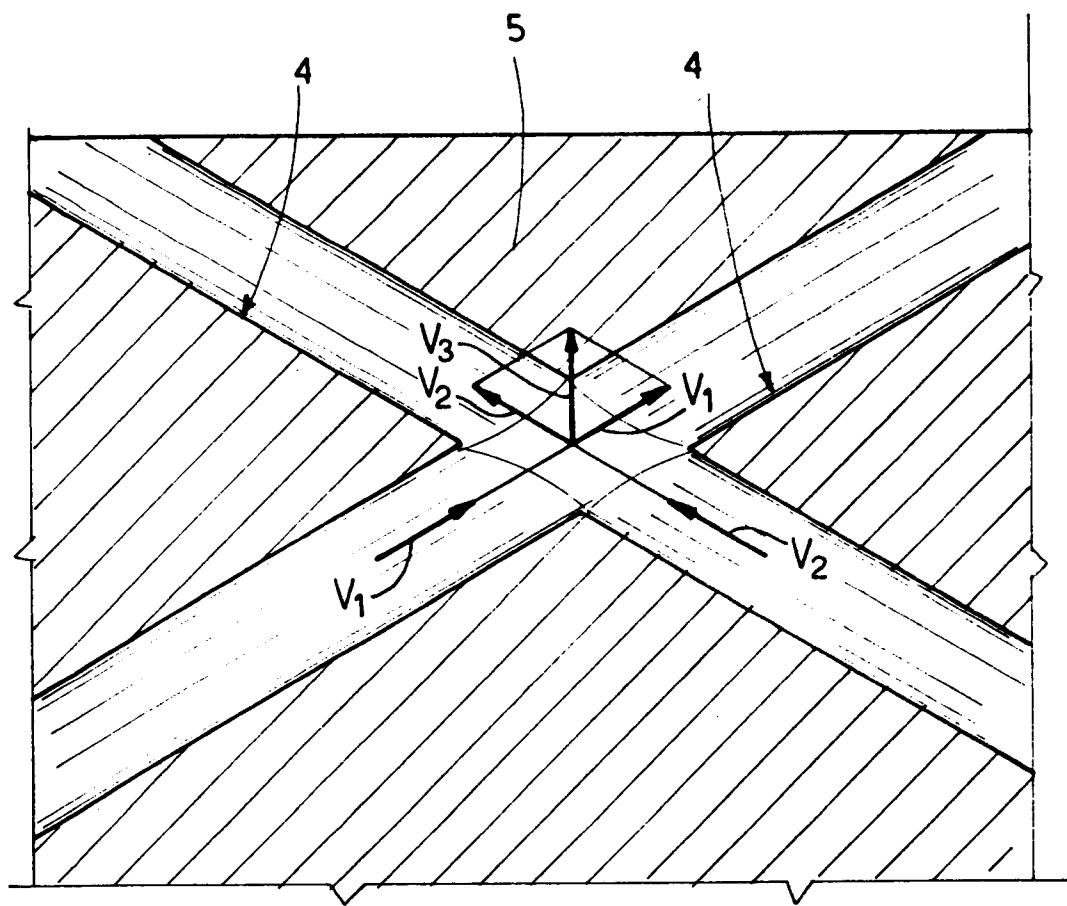


Fig.2





European Patent
Office

EUROPEAN SEARCH REPORT

0223158
Application number

EP 86 11 5375

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	US-A-4 369 739 (NISSAN) * Figure 2; column 5, lines 11-43 *	1	F 02 F 7/00 F 02 F 1/10
A	--- US-A-4 147 140 (NRDC) * Figure 1; column 2, lines 12-29 *	1	
A	--- US-A-2 722 922 (SHEPPARD) * Column 2, lines 37-64 *	1	
A	--- FR-A-1 598 344 (DAIMLER BENZ) * Page 2, lines 29-41 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			F 02 F F 01 P
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28-01-1987	Examiner WASSENAAR G.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			