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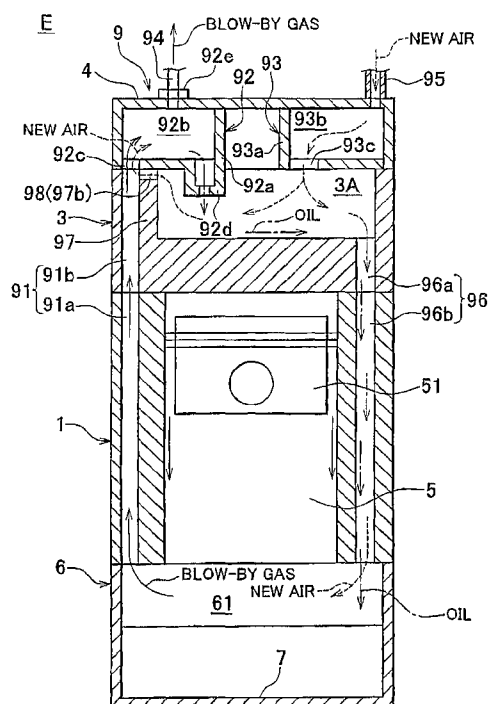
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(54) Title: POSITIVE CRANKCASE VENTILATION SYSTEM, CYLINDER HEAD USED FOR POSITIVE CRANKCASE VENTILATION SYSTEM, INTERNAL COMBUSTION ENGINE INCLUDING POSITIVE CRANKCASE VENTILATION SYSTEM, AND POSITIVE CRANKCASE VENTILATION METHOD

FIG. 3



(57) Abstract: A blow-by gas collection passage (91) extends in a cylinder block (1) and a cylinder head (3). A crank chamber (61) is connected to an oil separator (92) through the blow-by gas collection passage (91). A cutout portion is formed in an upper end portion of a wall portion (97) of the blow-by gas collection passage (91), and the oil separator (92) contacts an upper surface of the cylinder head (3) to form a connection portion (98) through which the blow-by gas collection passage (91) is connected to a cam chamber (3A). Thus, new air in the cam chamber (3A) flows into the blow-by gas collection passage (91) at an inlet portion of the oil separator (92) through the connection portion (98) to dilute the blow-by gas.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

FOIM

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 850 823 A (KASAHARA SATOSHI [JP]) 22 December 1998 (1998-12-22) the whole document	1, 12, 15
A	US 5 285 754 A (BELL LAWRENCE E [US]) 15 February 1994 (1994-02-15) abstract	1, 12, 15
A	DE 40 33 844 A1 (NISSAN MOTOR [JP]) 25 April 1991 (1991-04-25) abstract	1, 12, 15

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Further documents are listed in the continuation of Box C.



See patent family annex.

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1y¹ document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5850823	A	22-12-1998	CN	1309236 A	22-08-2001
			CN	1184203 A	10-06-1998
			DE	19747740 A l	10-06-1998
			JP	3389801 B2	24-03-2003
			JP	10159533 A	16-06-1998
US 5285754	A	15-02-1994	NONE		
DE 4033844	A l	25-04-1991	US	5069192 A	03-12-1991