



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.06.2011 Bulletin 2011/26

(51) Int Cl.:
F01M 9/10 (2006.01)

(21) Application number: **10380157.7**

(22) Date of filing: **15.12.2010**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(30) Priority: **23.12.2009 PCT/ES2009/070624**

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(54) **Improvements in lubricating the seats of a camshaft and rocker arm shaft in an internal combustion engine**

(57) The improvements are basically focused on a new arrangement of the lubrication pipes extending from a deep transverse bore located in the engine cylinder head, so that the novelty of the invention is focused on

that the lubricating oil route follows a path reaching through a first anterior pipe every camshaft seat, and from this seat a second posterior pipe flowing into each rocker arm seat shaft is extended.

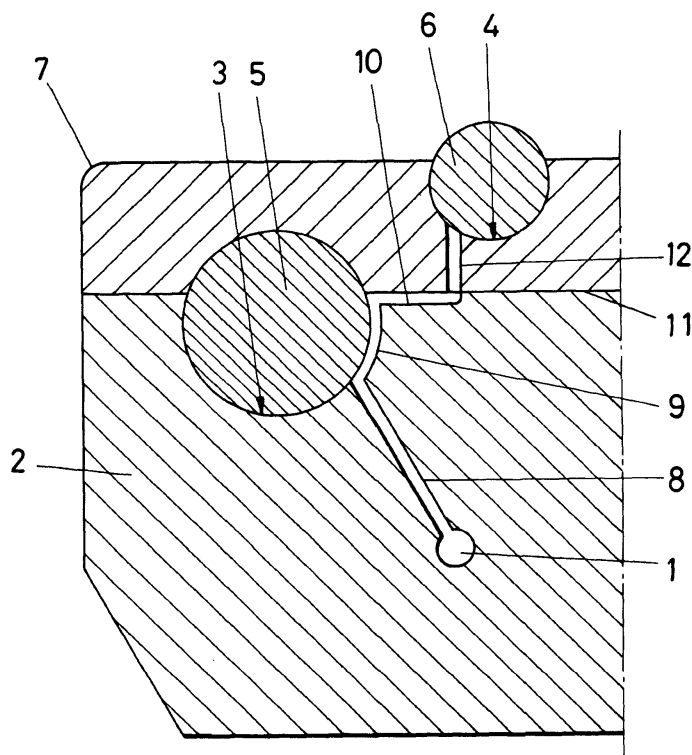


FIG.1

Description

OBJECT OF THE INVENTION

[0001] The present invention, as this specification states in its title, relates to some improvements in lubricating the seats of a camshaft and rocker arm shaft in an internal combustion engine intended for providing a better and effective greasing for such camshaft and rocker arm shaft seats.

[0002] For this purpose, the improvements are focused on a new arrangement of the lubrication pipes extending from a deep transverse bore located in the cylinder head, so that the novelty of the invention is focused on that the lubricating oil route follows a path reaching at first every camshaft seat through a first anterior pipe, and from this seat a second posterior pipe flowing into rocker arm shaft seat is extended.

BACKGROUND OF THE INVENTION

[0003] Currently, the lubrication of the camshaft and rocker arm shaft seats in an internal combustion engine is carried out by driving pressurized oil through an internal circuit using a pump actuated by the engine itself, so that said oil reaches a deep transverse bore that is part of this internal circuit while is located in the engine cylinder head, other pipes flowing into the camshaft and rocker arm shaft seats being extended from said deep transverse bore.

[0004] The lubrication system described in the previous paragraph is generally included, for example, in the German Invention Patent with publication number EP 1034358.

[0005] In conventional lubrication systems, at specific moments wherein the engine is subjected to high stresses requiring high power, the oil flow rate coming into the camshaft and rocker arm shaft seats may be insufficient and therefore could create problems in a smooth functioning of the engine assembly.

DESCRIPTION OF THE INVENTION

[0006] In order to achieve the objectives and avoid the drawbacks mentioned in the preceding paragraphs, the invention proposes some improvements in lubricating the seats of a camshaft and rocker arm shaft in an internal combustion engine.

[0007] The lubrication is in principle carried out through an internal pressurized oil circuit driven through a pump actuated by the engine itself; said internal circuit comprises different corridors in the cylinder head with a characteristic deep transverse bore, from which the pipes for providing oil to the camshaft and rocker arm shaft seats are extended.

[0008] The camshaft seats are located in the cylinder head, whereas the rocker arm shaft seats are located in an upper support solidly connected to the cylinder head

itself, and which also partially fixes through the top the camshaft in correspondence with its seats.

[0009] Starting from this premise, the improvements consists of some anterior pipes, each of which extends from the mentioned deep transverse bore and flows into an arcuate slot located in the respective camshaft seat, said arcuate slot being in turn in communication with a short duct located in the cylinder head, said duct being then in communication with a posterior pipe flowing into the rocker arm shaft seat, that posterior pipe passing through the upper support.

[0010] The improvements of the invention provide, among other, the following advantages:

- Better lubrication of the seats by receiving a greater oil flow rate.
- The short cylinder head duct allows a more effectively communication with the upstream anterior pipe towards the rocker arm shaft seat as for the flow rate path, even allowing moving the location of said upstream posterior pipe maintaining the oil fluid path, with no need of mechanizing the cylinder head again.
- The short cylinder head duct also allows providing, if necessary, oil fluid to any other hole located in a vertical pipe different from the posterior pipe flowing into to the respective rocker arm shaft seat.

[0011] Next, in order to facilitate a better understanding of this specification and being an integral part thereof, a single figure wherein with an illustrative and not limitative manner the object of the invention has been represented, is attached.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

Figure 1. - Shows a sectional view of a cylinder head assembly and upper support fixed to said cylinder head, showing the improvements in lubricating the seats of a camshaft and rocker arm shaft in an internal combustion engine, object of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] Considering the numbering adopted in the figures, the improvements in lubricating the seats of a camshaft and rocker arm shaft in an internal combustion engine are focused on the arrangement of some pipes extending from a deep transverse bore 1 made in a cylinder head 2, and such pipes flows into some camshaft 5 and rocker arm shaft 6 seats 3-4, respectively.

[0014] The camshaft 5 seats 3 are located in the cylinder head 2; whereas the rocker arm shaft 6 seats 4 are located in an upper bracket 7 fixed to the cylinder head 2, and which also holds at the top the camshaft 5 in correspondence with its seats 3.

[0015] The deep transverse bore 1 is part of an oil pres-

surized circuit driven through a pump that rotates using the operation of the engine itself.

[0016] More specifically the improvements are determined from anterior pipes 8, each of which extends from the deep transverse bore 1 and flows into an arcuate slot 9 located in the respective camshaft 5 seat 3. Said arcuate slot 9 is in communication with a short duct 10 located on the upper surface 11 of the cylinder head 2.

[0017] This short duct 10 communicates with a posterior pipe 12 flowing into the respective rocker arm shaft 6 seat 4. That posterior pipe 12 only affects the upper support 7.

Claims

1. IMPROVEMENTS IN LUBRICATING THE SEATS OF A CAMSHAFT AND ROCKER ARM SHAFT IN AN INTERNAL COMBUSTION ENGINE, the lubrication passing through an internal pressurized oil circuit driven by a pump that moves oil flow rate towards a deep transverse bore located in a cylinder head and from which pipes are extended, through which the oil comes into the seats of a camshaft and a rocker arm shaft, the camshaft seats being located in a cylinder head, whereas the rocker arm shaft seats are located in an upper support sit on an upper surface of the cylinder head, which in turn also holds a part of the camshaft in correspondence with its seats, **characterized in that** comprise anterior pipes (8), each of which extends from the deep transverse bore (1) and flows into an arcuate slot (9) located in the respective camshaft (5) seat (3), the arcuate slot (9) being in turn in communication with a short duct (10) established in the cylinder head (2), this short duct (10) being in turn in communication with a posterior pipe (12) flowing into the respective rocker arm shaft (6) seat (4), the short duct (10) being located in correspondence with the upper surface (11) of the cylinder head (2), whereas the posterior pipe (12) affects the upper support (7) sitting on that upper surface (11) of the cylinder head (2).

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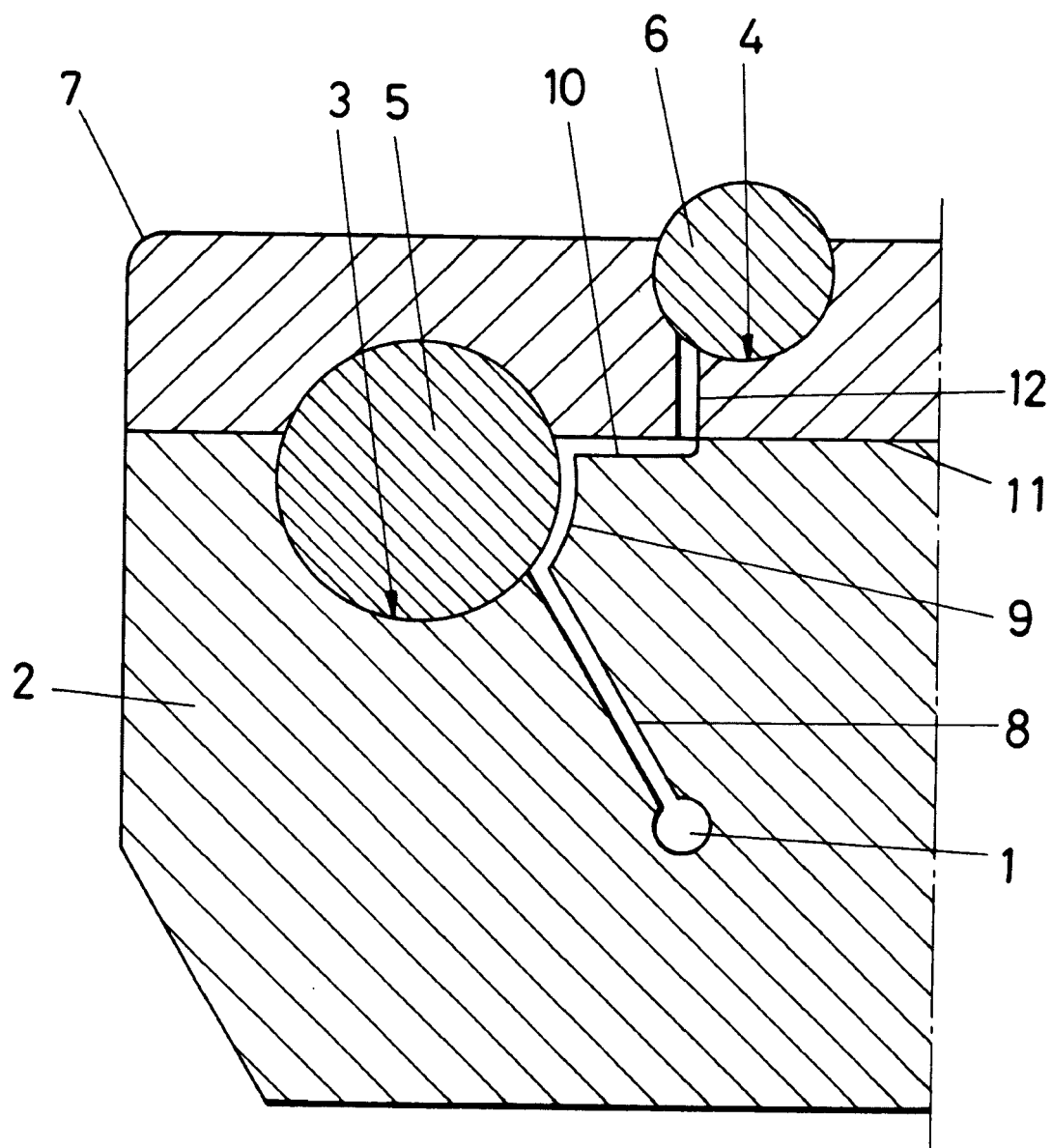


FIG.1



EUROPEAN SEARCH REPORT

Application Number
EP 10 38 0157

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 744 531 A1 (PORSCHE AG [DE]; RENAULT [FR]) 27 November 1996 (1996-11-27) * abstract; figures *	1	INV. F01M9/10
A	US 6 237 719 B1 (FUJII NORIAKI [JP] ET AL) 29 May 2001 (2001-05-29) * abstract; figures *	1	
A	EP 1 865 159 A2 (FORD GLOBAL TECH LLC [US]) 12 December 2007 (2007-12-12) * figures *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			F01M
Place of search		Date of completion of the search	Examiner
Munich		17 May 2011	Vedoato, Luca
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			

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EPO FORM 1503 (03.02 (P04C01))

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 38 0157

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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17-05-2011

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EP 0744531	A1	27-11-1996	DE 59504986 D1	11-03-1999
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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1034358 A [0004]