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(54) Valve timing control apparatus and internal combustion engine equipped with the same

(57) A valve timing control apparatus for changing a relative rotational phase of a camshaft (8 or 10) with respect to a crankshaft (2) using a hydraulic pressure of a hydraulic oil supplied from an oil pump (16) includes a chain cover (4, 204, 304), a phase changing mechanism (30), a selector valve (18), and an intermediate oil passage. The chain cover (4, 204, 304) defines a valve chamber (12, 212, 312) having an inlet port (15b, 215b, 315b) for the hydraulic oil, an advancement port (15a, 215a, 315a), and a retardation port (15c, 215c, 315c). The phase changing mechanism (30) is coupled to an end portion of the camshaft (8 or 10) with the phase changing mechanism (30) being at least partially covered by the chain cover (4, 204, 304). The phase changing mechanism (30) has a plurality of hydraulic pressure chambers including an advancement chamber (38A) and a retardation chamber (38B). The selector valve (18) is housed in the valve chamber (12, 212, 312) of the chain cover (4, 204, 304), and configured and arranged to selectively open the advancement port (15a, 215a, 315a) or the retardation port (15c, 215c, 315c). The intermediate oil passage forming member (50, 150, 250, 350) is for conveying the hydraulic oil in the valve chamber (12, 212, 312) of the chain cover (4, 204, 304) from the advancement port (15a, 215a, 315a) of the valve chamber (12, 212, 312) to the advancement chamber (38A) of the phase changing mechanism (30), and from the retardation port (15c, 215c, 315c) of the valve chamber (12, 212, 312) to the

retardation chamber (38B) of the phase changing mechanism (30).

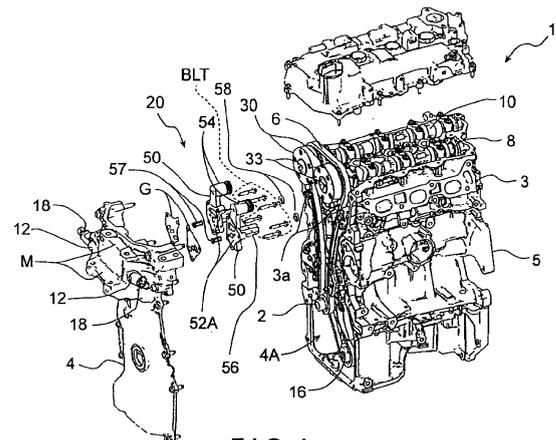


FIG. 1

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EUROPEAN SEARCH REPORT

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EP 10 01 4303

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Place of search Munich		Date of completion of the search 23 February 2012	Examiner Paulson, Bo	
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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ANNEX TO THE EUROPEAN SEARCH REPORT
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