

Title (en)

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

Title (de)

Ventilzeitsteuerungsvorrichtung und Verbrennungsmotor damit

Title (fr)

Appareil de commande de synchronisation de soupape et moteur à combustion interne équipé de celui-ci

Publication

EP 2354478 A3 20120404 (EN)

Application

EP 10014303 A 20101104

Priority

JP 2010028271 A 20100210

Abstract (en)

[origin: EP2354478A2] 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).

IPC 8 full level

F01L 1/053 (2006.01); **F01L 1/34** (2006.01); **F01L 1/344** (2006.01); **F01L 9/10** (2021.01)

CPC (source: EP)

F01L 1/053 (2013.01); **F01L 1/34** (2013.01); **F01L 1/344** (2013.01); **F01L 2001/34426** (2013.01)

Citation (search report)

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- [Y] JP 2009174411 A 20090806 - HITACHI LTD
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- [A] GB 2330894 A 19990505 - MECHADYNE INT PLC [GB]
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Cited by

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Designated contracting state (EPC)

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 state (EPC)

BA ME

DOCDB simple family (publication)

EP 2354478 A2 20110810; EP 2354478 A3 20120404; EP 2354478 B1 20130904; EP 2354478 B8 20131106; CN 102146819 A 20110810; CN 102146819 B 20150114; JP 2011163240 A 20110825; JP 5684990 B2 20150318

DOCDB simple family (application)

EP 10014303 A 20101104; CN 201110033857 A 20110128; JP 2010028271 A 20100210