

Title (en)

Valve opening/closing timing control device

Title (de)

Vorrichtung zur Steuerung der Ventilöffnungs-/Schließungszeit

Title (fr)

Dispositif de commande temporelle d'ouverture/fermeture de soupape

Publication

**EP 2305969 A1 20110406 (EN)**

Application

**EP 10002825 A 20100317**

Priority

JP 2009222386 A 20090928

Abstract (en)

A valve opening/closing timing control device includes: a driving side rotational member; a driven side rotational member; a retarded angle chamber and an advanced angle chamber; a lock mechanism; and a spiral spring providing a biasing force in a predetermined phase direction in a retarded angle region of a relative rotational phase of the driven side rotational member to the driving side rotational member from a most retarded angle phase to a predetermined phase, and not providing the biasing force to a most advanced angle phase from the predetermined phase.

IPC 8 full level

**F01L 1/344** (2006.01)

CPC (source: EP US)

**F01L 1/3442** (2013.01 - EP US); **F01L 2001/34483** (2013.01 - EP US)

Citation (applicant)

- US 2009211549 A1 20090827 - MYERS JESSE [US], et al
- WO 2005049976 A1 20050602 - INA SCHAEFFLER KG [DE], et al
- US 2009188456 A1 20090730 - DUPUIS CRAIG [CA], et al
- US 2007277757 A1 20071206 - FISCHER THOMAS H [US], et al

Citation (search report)

- [I] US 2009211549 A1 20090827 - MYERS JESSE [US], et al
- [I] WO 2005049976 A1 20050602 - INA SCHAEFFLER KG [DE], et al
- [I] US 2009188456 A1 20090730 - DUPUIS CRAIG [CA], et al
- [I] US 2007277757 A1 20071206 - FISCHER THOMAS H [US], et al
- [A] DE 19854891 A1 19990610 - AISIN SEIKI [JP]
- [A] DE 19903624 A1 19990812 - AISIN SEIKI [JP]

Cited by

GB2530123A; EP2666979A3; EP3109422A3; US9151190B2; DE102017111385A1; WO2013046474A1; US9506378B2; US11946395B2

Designated contracting state (EPC)

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 SE SI SK SM TR

Designated extension state (EPC)

AL BA ME RS

DOCDB simple family (publication)

**EP 2305969 A1 20110406**; **EP 2305969 B1 20120620**; CN 102032011 A 20110427; CN 102032011 B 20140129; JP 2011069316 A 20110407; JP 5516937 B2 20140611; US 2011073056 A1 20110331

DOCDB simple family (application)

**EP 10002825 A 20100317**; CN 201010139966 A 20100330; JP 2009222386 A 20090928; US 74974410 A 20100330