

Title (en)  
STARTER, START CONTROL DEVICE, AND CRANK ANGLE DETECTOR OF INTERNAL COMBUSTION ENGINE

Title (de)  
ANLASSER, ANLASSSTEUERVORRICHTUNG UND KURBELWELLENWINKELGEBER EINER BRENNKRAFTMASCHINE

Title (fr)  
DEMARREUR, DISPOSITIF DE COMMANDE DE DEMARRAGE ET DETECTEUR D'ANGLE DE VILEBREQUIN D'UN MOTEUR A COMBUSTION INTERNE

Publication  
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Application  
**EP 00977866 A 20001122**

Priority

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- JP 33316499 A 19991124
- JP 34276699 A 19991202

Abstract (en)  
Realizing a more efficient engine starting control by recognizing an absolute angle of a crank shaft in an engine. An absolute angle of the crank shaft 13 is calculated on the basis of an ignition reference signal of the engine and a commutation position pulse signal of a starter motor 10, and the starter motor 10 is controlled on the basis of the absolute angle. The starter motor 10 is reverse-rotated on the basis of the calculated absolute angle and the crank shaft 13 is temporarily reverse-rotated to an explosion stroke and thereafter is normal-rotated, and thereby the engine is started. Timing from the reverse rotation of the crank shaft 13 to the normal rotation is accurately controlled by the absolute angle, and an efficient inertial starting control can be realized on a engine starting control without waste. Further, it is possible to accurately recognize the absolute angle of the crank shaft 13 in the engine by a crank angle detecting apparatus without increasing the number of the reluctors 40. <IMAGE>

IPC 1-7  
**F02D 41/06**; F02D 35/00; F02P 7/067; F02D 41/34; G01P 3/00; F02N 11/08

IPC 8 full level  
**F02D 41/06** (2006.01); **F02D 41/34** (2006.01); **F02N 11/00** (2006.01); **F02N 11/06** (2006.01); **F02N 11/08** (2006.01); **F02N 19/00** (2010.01); **F02N 99/00** (2010.01); **F02P 7/067** (2006.01)

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Cited by  
WO2016016835A1; EP3851664A1; EP1375908A3; EP1486667A3; CN106536917A; EP3126655A4; EP3064763A4; EP3705713A1; EP2963784A4; EP3051118A4; DE102017220728A1; EP3837436A4; EP1375907A3; EP3306074A3; US7105944B2; WO2020035882A1; US7681545B2; US11703005B2; WO2023187806A1; WO2023186493A1; WO2005045239A1; WO2017021315A1; US10100799B2; WO2016016812A1; US10233887B2; US10066591B2

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