



(12) **CORRECTED EUROPEAN PATENT APPLICATION**  
published in accordance with Art. 153(4) EPC

(15) Correction information:  
**Corrected version no 1 (W1 A1)**  
**Corrections, see**  
**Bibliography INID code(s) 72**

(51) Int Cl.: **F02D 17/00** (2006.01) **F02D 29/02** (2006.01)

(86) International application number:  
**PCT/JP2011/072343**

(48) Corrigendum issued on:  
**28.08.2013 Bulletin 2013/35**

(87) International publication number:  
**WO 2013/046387 (04.04.2013 Gazette 2013/14)**

(43) Date of publication:  
**10.07.2013 Bulletin 2013/28**

(21) Application number: **11866438.2**

(22) Date of filing: **29.09.2011**

(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**

• **YOSHITOMI, Yuuya**  
**Toyota-shi, Aichi-ken, 471-8571 (JP)**  
• **KAWAI, Toshihiro**  
**Toyota-shi, Aichi-ken, 471-8571 (JP)**

(71) Applicant: **TOYOTA JIDOSHA KABUSHIKI KAISHA**  
**Toyota-shi, Aichi-ken, 471-8571 (JP)**

(74) Representative: **Kuhnen & Wacker**  
**Patent- und Rechtsanwaltsbüro**  
**Prinz-Ludwig-Strasse 40A**  
**85354 Freising (DE)**

(72) Inventors:  
• **KONDO, Yumi**  
**Toyota-shi, Aichi-ken, 471-8571 (JP)**

(54) **ENGINE STARTUP DEVICE AND CONTROL METHOD**

(57) A starter includes a pinion gear that can be engaged with a ring gear coupled to a crank shaft of an engine, an actuator that moves the pinion gear to a position where the pinion gear is engaged with a ring gear, and a motor that rotates the pinion gear. An ECU stops the engine when a predetermined stop condition is satisfied, and cranks the engine with a motor when a predetermined start condition is satisfied after the engine is stopped. The motor and the actuator are supplied with electric power from a battery. The ECU includes a mode in which the motor is driven prior to driving of the actuator. The ECU restricts a stop of the engine if, of a decreased voltage of the battery after driving the motor and a decreased voltage of the battery after driving the actuator, the lower voltage falls below a threshold value.

