

Title (en)

STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES AND STARTING CONTROL DEVICE

Title (de)

ANLASSVORRICHTUNG FÜR VERBRENNUNGSMOTOR UND ANLASSSTEUERVORRICHTUNG

Title (fr)

DISPOSITIF DE DEMARRAGE POUR MOTEURS A COMBUSTION INTERNE ET DISPOSITIF DE COMMANDE DE DEMARRAGE

Publication

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Application

**EP 99959719 A 19991209**

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- JP 35057898 A 19981209
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- JP 35058198 A 19981209

Abstract (en)

[origin: EP1055816A1] When the internal combustion engine is made to start moving, the starter motor is made to turn backward along with the crankshaft to bring the piston temporarily back into the exhaust stroke. Thereafter, the starter motor is made to turn forward and the engine is made to start moving with the piston located in the exhaust stroke. After the starter motor is turned backward for time t1 of energization for backward revolution, the crankshaft is made to turn by inertia for time t2 of suspension of energization in order to place the piston in the exhaust stroke. The times t1 and t2 may be selected from a map of duration of energization for backward revolution and a map of duration of suspension of energization respectively or, alternatively, controlled on a feedback basis by determining the rotational speed and the rate of change of the rotational speed and/or the rotational angle of the starter motor from the pulse signal indicating the commutation position. With this arrangement, inertial energy for forward revolution is accumulated in the rotary system of the crankshaft during the exhaust stroke and the intake stroke so that the compression stroke of the piston can be got through by the effect of combining the inertial energy and the rotational energy of the starter motor. Then, the starter motor can be down-sized to reduce its cost. Alternatively, the crankshaft may be turned backward to the explosion stroke to compress the gas in the combustion chamber so that energy for forward revolution is accumulated as a result of the reaction force of the compression. Additionally, when turning forward, the performance of the motor may be selectively utilized, that is, the starter motor may be made to start operating by intensifying the field by means of control magnetic poles and, when the number of revolutions of the motor gets to a predetermined level, the field may be weakened to increase the maximum number of revolutions of the motor. <IMAGE>

IPC 8 full level

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Citation (search report)

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