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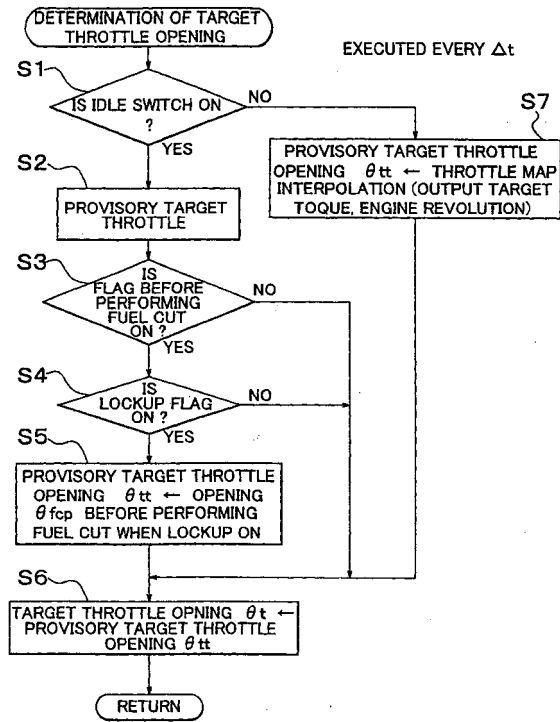
(54)

Control apparatus and method of internal combustion engine

(57)

A control apparatus of an internal combustion engine for performing fuel cut control for suspending fuel supply to the internal combustion engine during the operation, comprising at least any one of means for controlling immediately before the fuel cut control to control the torque from the internal combustion engine to driving wheels in a power transmission system from the internal combustion engine to the driving wheels in the decrease direction, immediately before performing the fuel cut control, in case when the fuel cut control execution is determined (steps S5, S6), and means for controlling immediately after the fuel cut control to control the torque from the internal combustion engine to the driving wheels in the power transmission system from the internal combustion engine to the driving wheels in the increase direction, immediately after performing the fuel cut control, in case when the fuel cut control is executed.

FIG. 1





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EUROPEAN SEARCH REPORT

Application Number
EP 01 11 3403

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 44 45 462 A (BOSCH GMBH ROBERT) 27 June 1996 (1996-06-27) * the whole document *	1-5,9	F02D41/12 F02D41/00
A	DE 198 32 198 A (BAYERISCHE MOTOREN WERKE AG) 20 January 2000 (2000-01-20) * column 1, line 15 - line 32 *	5	
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A	EP 1 004 761 A (HONDA MOTOR CO LTD) 31 May 2000 (2000-05-31) * abstract; figure 15 *	6,7	
A	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 14, 31 December 1998 (1998-12-31) & JP 10 246132 A (NISSAN MOTOR CO LTD), 14 September 1998 (1998-09-14) * abstract *	6,7	
A	PATENT ABSTRACTS OF JAPAN vol. 007, no. 120 (M-217), 25 May 1983 (1983-05-25) & JP 58 038350 A (TOYOTA JIDOSHA KOGYO KK), 5 March 1983 (1983-03-05) * abstract *	1,6,7	F02D B60K B60H
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 20 April 2004	Examiner Aign, T
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
1-7, 9
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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LACK OF UNITY OF INVENTION
SHEET B

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-5,9

Torque control through intake air amount control of an internal combustion engine, controlling intake air quantity to decrease immediately before fuel cut and increase immediately after fuel cut.

2. Claims: 6,7

Torque control through controlled driving of an auxiliary load of an internal combustion engine, controlling the auxiliary load to increase immediately before fuel cut and decrease immediately after fuel cut.

3. Claim : 8

Torque control through transmission control of a drive train including an internal combustion engine, controlling a variable torque transmission efficiency to be high immediately before and after fuel cut.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 11 3403

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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20-04-2004

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