



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
29.03.2000 Bulletin 2000/13

(51) Int. Cl.⁷: **F02D 41/16**, F02D 41/08,
F02D 41/38, F02D 31/00

(43) Date of publication A2:
12.05.1999 Bulletin 1999/19

(21) Application number: **98121045.3**

(22) Date of filing: **05.11.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Amano, Naoki**
Toyota-shi, Aichi-ken 471-8571 (JP)

(30) Priority: **06.11.1997 JP 30430897**

(74) Representative:
**Leson, Thomas Johannes Alois, Dipl.-Ing. et al
Patentanwälte
Tiedtke-Bühling-Kinne & Partner,
Bavariaring 4
80336 München (DE)**

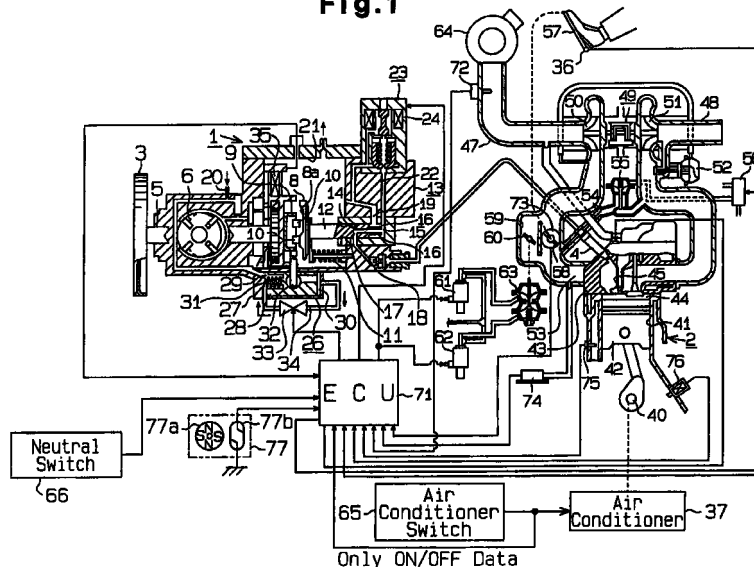
(71) Applicant:
**TOYOTA JIDOSHA KABUSHIKI KAISHA
Aichi-ken 471-8571 (JP)**

(54) **Idle speed control apparatus for engine**

(57) An apparatus for controlling the idle speed of an engine (2) is disclosed. The apparatus includes an electric control unit (ECU) (71) for controlling the engine speed, an air conditioner switch (65) for detecting application and removal of an external engine load, or air conditioner (37), and sensors (36, 66, 77) for detecting that the engine (2) is idling when the vehicle is stationary and when the vehicle is moving. The ECU (71) gradually increases the engine speed by a predetermined

amount to shift the engine (2) to a raised idle state when the external engine load (37) is applied and gradually decreases the engine speed by the predetermined amount when the external engine load (37) is removed. The ECU (71) adjusts the engine speed at a certain rate when the vehicle is stationary and at a different rate when the vehicle is traveling.

Fig.1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 12 1045

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.6)
A,D	PATENT ABSTRACTS OF JAPAN vol. 018, no. 432 (M-1654), 11 August 1994 (1994-08-11) & JP 06 129292 A (TOYOTA MOTOR CORP), 10 May 1994 (1994-05-10) * abstract *	1,6,7	F02D41/16 F02D41/08 F02D41/38 F02D31/00
A	--- US 5 033 432 A (OHUCHI HIROFUMI ET AL) 23 July 1991 (1991-07-23) * column 2, line 5 - line 44 * * column 4, line 36 - line 47 * * column 5, line 7 - column 6, line 64; figures *	1,5-10	
A	--- EP 0 318 467 A (HONDA MOTOR CO LTD) 31 May 1989 (1989-05-31) * column 3, line 16 - line 62 * * column 6, line 43 - column 8, line 46; figures *	1,2,5-10	
A	--- PATENT ABSTRACTS OF JAPAN vol. 010, no. 238 (M-508), 16 August 1986 (1986-08-16) & JP 61 070150 A (TOYOTA MOTOR CORP), 10 April 1986 (1986-04-10) * abstract *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6) F02D
A	--- US 4 513 710 A (ITO HIROSHI ET AL) 30 April 1985 (1985-04-30) * the whole document *	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 7 February 2000	Examiner Moualed, R
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)

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

EP 98 12 1045

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

07-02-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 06129292 A	10-05-1994	NONE	
US 5033432 A	23-07-1991	JP 3130548 A CA 2027090 A,C	04-06-1991 13-04-1991
EP 0318467 A	31-05-1989	JP 61294151 A JP 61294152 A DE 3681079 A EP 0206091 A US 4819596 A US 4760823 A	24-12-1986 24-12-1986 02-10-1991 30-12-1986 11-04-1989 02-08-1988
JP 61070150 A	10-04-1986	NONE	
US 4513710 A	30-04-1985	JP 1629123 C JP 2057211 B JP 58028569 A	20-12-1991 04-12-1990 19-02-1983