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(54) **Crankcase-evaporated fuel detection system (blow-by)**

(57) **"Crankcase-evaporated Fuel Detection System (Blow-By)"**, which has as purpose the blow-by in Flexible Fuel Vehicles (FFV), consubstantiating in a software of the existing vapor coming from the crankcase oil (blow-by), having as purpose to estimate the amount of fuel deposited during the motor startup and its cold operation phase, as well as to estimate of the amount being

evaporated from the crankcase and coming into the manifold during the hot operation phase of the motor; further, recognizing the fuel the vehicle was supplied with to prevent errors from occurring in order to provide the vehicle with a consistent operation.

EP 1 710 419 A1

Description

[0001] This patent is about the invention of a CRANK-CASE-EVAPORATED FUEL DETECTION SYSTEM (BLOW-BY), which has as purpose to enable the FLEX system catch, as well as the identification of the fuel amount or mixture in the tank, adjusting the motor operation to the fuel, keeping the vehicle's performance and releasing the use of an additional physical sensor, thus thoroughly meeting the intended purposes and providing a number of benefits inherent to its serviceability, among them we mention the following:

- Fuel identification accuracy;
- Prevention of bad driveability;
- Improvement of fuel control;
- Improvement of some cold startup conditions;
- Improvement of vehicle emissions.

[0002] Depending on the type of fuel in the tank (A/F) and the startup conditions, such as temperature (T_{H2O}), injection time (Qty_c), etc., a fuel deposition in the crankcase (Qcc) may occur during the cold phase injection. After some operating time, such fuel evaporates from the crankcase (V_{Qcc}) and returns to the intake manifold input through the blow-by pipe. The main effects of this deposited fuel in the crankcase are the evaporation thereof, enhancing the air/fuel (A/F) mixture.

[0003] This system allows for the identification of the A/F during the blow-by in FLEX vehicles. It consubstantiates in a software of the existing vapor coming from the crankcase oil (blow-by), which was designed to estimate the amount of fuel deposited in the crankcase (Qcc) during the motor startup and its cold operation, as well as an estimate of the amount being evaporated from the crankcase (V_{Qcc}) and coming into the manifold during the hot operation of the motor.

[0004] The system includes a logic sensor SFS (R pending) inside an electronic exchange. Such electronic exchange recognizes the fuel the vehicle was supplied with. The electronic exchange adjusts itself to the various chemical compositions that will supply the motor, in order to provide it with a consistent operation.

[0005] The software referred to is important for FLEX systems, since while there is fuel evaporating from the crankcase, the system will catch the A/F mixture as the motor load (P_{col}) is within the limits set forth by the software, since an outside factor will be affecting the A/F (air/fuel) mixture. As the software of the existing blow-by can estimate the deposited amount and the evaporated amount, it can, under specific conditions (Z_0) estimate the amount of deposited fuel and the amount of deposited fuel already evaporated.

1) Determination of the blow-by content in the crankcase (Qcc):

[0006]

$Q_{cc} = f(T_{H2O}, A/F, Qty_c)$, where:

Q_{cc} = Amount of fuel in the crankcase;

T_{H2O} = Motor water temperature;

A/F = Air/fuel ratio;

Qty_c = Amount of injected fuel.

2) Fuel vaporization (V_{Qcc})

[0007]

$(V_{Qcc}) = f(T_{H2O}, P_{col}, Q_{cc})$, where:

V_{Qcc} = Percentage of evaporated fuel;

P_{col} = Manifold pressure.

3) Catch zone (Z_a)

[0008]

$Z_a = f(\% V_{Qcc}, K_{O2})$, where:

Z_3 = Permissible zone for new A/F catch;

K_{O2} = Percentage of stoichiometry bypass.

Claims

1. "Crankcase-evaporated Fuel Detection System (Blow-By)", characterized by the principle of determining the fuel content in the crankcase during the motor startups and its cold operation phase; by estimating the vaporization of such fuel during the heating phase of the motor; and for FLEX vehicles, by determining a safe zone to maintain the fuel inside the tank; and by consubstantiating in a software of the existing vapor coming from the crankcase oil (blow-by), having as purpose to estimate the amount of fuel deposited during the motor startup and its cold operation phase, as well as an estimate of the amount being evaporated from the crankcase and coming into the manifold during the hot operation phase of the motor; further, to prevent errors from occurring when recognizing the fuel the vehicle was supplied with, in order to provide the vehicle with a consistent operation.



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EP 06 00 6072

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Place of search Munich		Date of completion of the search 23 June 2006	Examiner Mallo Lopez, M
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	

3
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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The members are as contained in the European Patent Office EDP file on
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