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(56) Documents Cited:
US 20150238904 A1 **US 20140060012 A**
US 20100242448 A

(58) Field of Search:
 INT CL **B01D, F01N**
 Other: **WPI, EPODOC**

(54) Title of the Invention: **Fuel emission reduction by enhance combustion using ionisation**
 Abstract Title: **Vehicle exhaust gas analysis and treatment using ionisation and chemical reductant**

(57) Fuel 1 and air 2 are combusted in a chamber 5, samples of the exhaust gas pass through a filter 10 to an ionising chamber 14. The different gases are subjected to varying voltages by an ionising device 13 and the resultant current 15 is measured. The ionising voltages and currents are used by a microprocessor or ECU 9 to control the air / fuel ratio or mixture strength supplied to the engine to minimise the production of harmful gases. In addition, chemical substances which may be oxygen or hydrogen may be added from a reservoir 16 to the ionisation chamber in response to signals from the ECU. The additives may react with the carbon atoms in the ionisation chamber to reduce or convert the harmful gases into harmless compounds. The contents of the ionisation chamber exits through 12 to the main exhaust outlet 8.

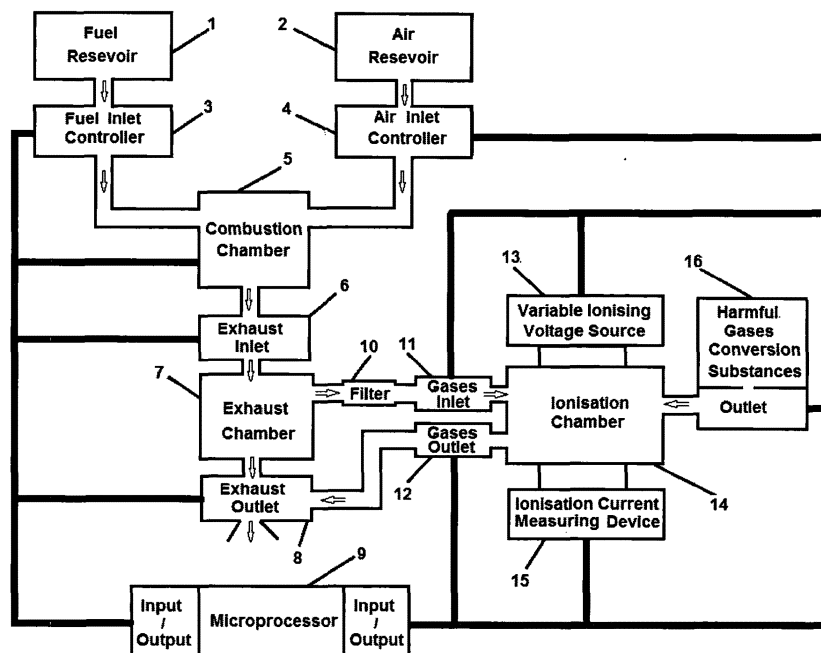


Fig 1

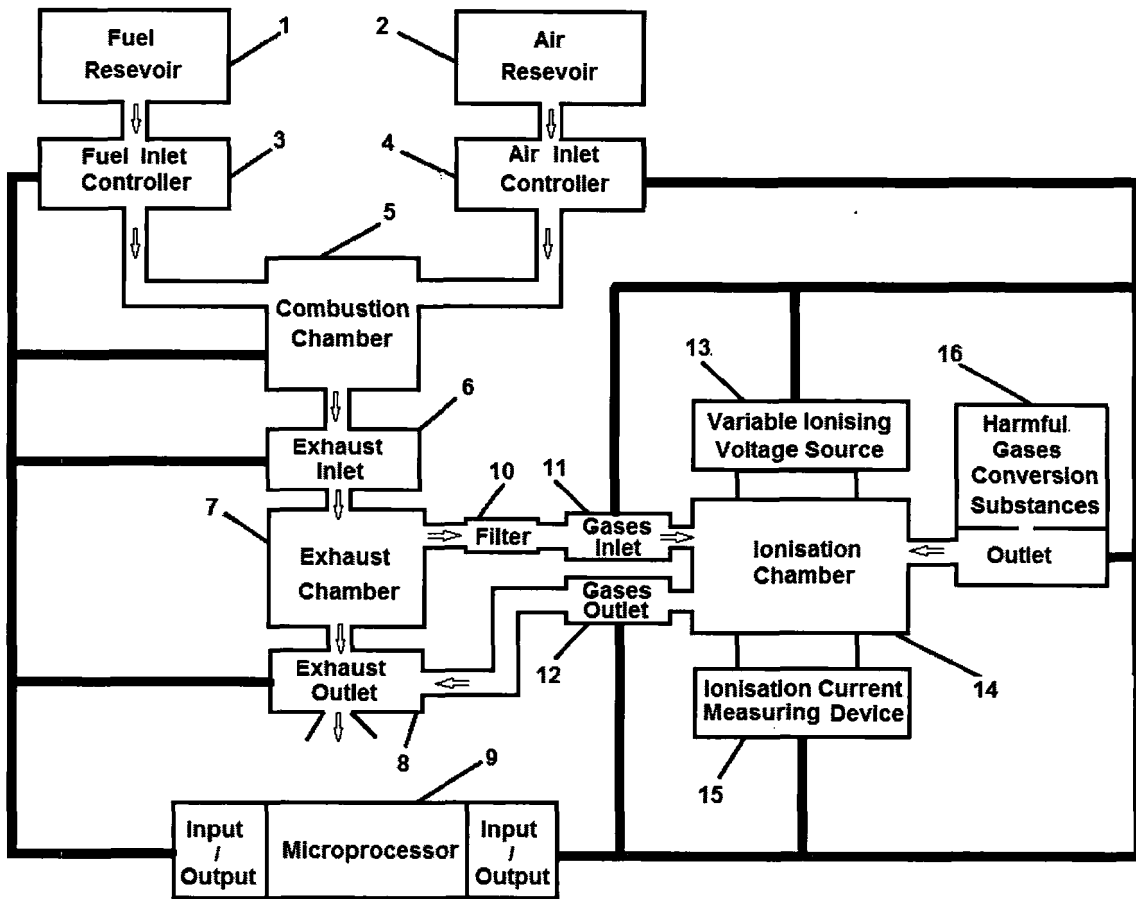


Fig 1

Fuel emission reduction by enhanced combustion using ionisation

This invention relates to a servomechanism, in a combustion engine, to enhance combustion by regulating air and fuel mixture and convert pollutant gases into harmless compounds.

Fuel emissions are considered to be responsible for air pollution and global warming. The pollutant emissions are produced as result of burning fossil fuels, such as petrol and diesel in internal combustion engines to provide motive power. The exhaust fumes contain harmful gases, such as carbon dioxide, carbon monoxide and nitrogen oxide. The production of such pollutant gases depends to a great extent to the efficient mixture of fuel and air. However it is ideal to neutralise these harmful gases altogether. There are catalytic converters, which convert pollutant gases into less harmful gases in the exhaust system. But they are relatively expensive and are not universally used.

The current invention proposes an automatic system to regulate the air and fuel mixture for optimum fuel efficiency by ionising a sample of exhaust gases. The values of ionising voltages and currents could be used by a microprocessor to evaluate the presence and quantities of pollutant gases and adjust the inlets of air and fuel, in order, to reduce the emission of harmful gases.

According to the present invention there is provided a method, to be used in a combustion engine, to reduce fuel emissions by detecting the presence and the quantity of pollutant gases by ionisation of emitted gases and using the ionisation data to regulate the air and fuel mixture to reduce the production of harmful gases, which could further be converted chemically into less harmful ones by introduction of external substances in the ionisation process.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawing in which:

Figure 1 shows the overall system in a block diagram.

In the proposed system, the various processes are carried out under the control of the microprocessor 9. The thick black lines, in the Fig 1, depict the connections between the microprocessor 9 and the various parts it controls.

Referring to Fig1, fuel from the reservoir 1 and air from reservoir 2 are added and mixed in the combustion chamber 5, via fuel inlet 3 and air inlet 4. After the combustion, the exhaust fumes are allowed into the exhaust chamber 7, via the exhaust inlet 6.

The exhaust gases are then sampled, from the exhaust chamber 7, via the gas filter 10 and the gases inlet 11, into the ionisation chamber 14, where various voltages, by the variable voltage source 13, are then be applied to the gases to ionise them. Various gases may be ionised under different applied voltages. The resulting ionisation currents are measured by the current measuring device 15. The ionising voltages and currents values are used by the microprocessor 9 to regulate the fuel and air mixture, in order, to reduce the production of pollutant gases. The contents of ionisation chamber 14 are evacuated into the exhaust outlet 8 through the gases outlet 12.

In addition to fuel and air regulation, the contents of exhaust chamber 7 can be allowed into the ionisation chamber 14, where external substances are also introduced from reservoir 16. Ionisation voltages are then applied in order to cause a chemical reaction between such substances and the harmful gases to convert them into harmless gases and compounds. For example, hydrogen and oxygen produced as the result of electrolysis of distilled water, can be allowed into the ionisation chamber 14 during the ionisation process to react with the carbon atoms of carbon dioxide and carbon monoxide to form hydrogen and oxygen bonds and hence converting the pollutant gases into other harmless compounds.

CLAIMS

1. According to the present invention there is provided a method, to be used in a combustion engine, to reduce fuel emissions by detecting the presence and the quantity of pollutant gases by ionisation of emitted gases and using the ionisation data to regulate the air and fuel mixture to reduce the production of harmful gases, which could further be converted chemically into less harmful ones by introduction of external substances in the ionisation process.

2. A fuel emission reduction method substantially as described herein with reference to figure 1 of the accompanying drawing.



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Examiner: Gareth Jones

Claims searched: All

Date of search: 14 April 2016

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1 at least	US2015/0238904 A1 (TAKADA et al) See figure 1 and paragraphs (0040 - 0046).
X	1 at least	US2014/060012 A (KAKIMOTO) See at least figures 1 and 3 and paragraphs (0006, 0009, 0022,0050, 0051)
X	1 at least	US2010/0242448 A (MITAL) See all figures and paragraphs (0023-0020).

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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Worldwide search of patent documents classified in the following areas of the IPC

B01D; F01N

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
F01N	0003/00	01/01/2006