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Device for Using Hydrogen Gas as Environmental Friendly Fuel for Automotive Engine (GREEN & ECO H_2)

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Abstract

Large investments have already been made in Europe and US to discover a new fuel which can be used Instead of gasoline for the engines of cars. So they discover that the liquid hydrogen will be the future fuel.
The research provides a new method to reduce the gasoline and its exhaust emission to (80%) using hydrogen gas with simple materials and low cost in G.I.C engines.
First step to reach the project goals we designed a new mechanism that uses the electrolysis process to get the hydrogen gas, according to the factors that affect the production of Hydrogen gas.
Second step: injecting the hydrogen gas to the engine with the air to burn inside the Combustion chamber with the gasoline to produce the same energy or more than it with less consumption of fossil fuel to achieve the main goal of the project to reduce the gasoline and the exhaust to (80%).
After using our new technology to increase the surface area of the stainless steel by coating the electrode with a layer made from Cobalt and Nickel and by putting the electrodes of stainless steel on equal distance and close to each other; the production of hydrogen gas increases.

Keywords: SI; Spark Ignition, HP; Horse Power, R.P.M; Revolution per Minute, G.I.C; Gasoline Internal Combustion

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I. INTRODUCTION

Global warming is considered one of the major problems the scientific community has to face. Faster rate of depletion of fossil fuel, day to day increase of automotive vehicles and stringent emission norms created a thirst to the researchers to find out an alternative that can be used in the compression ignition engines, with less modification or without any modification.

Many theories refer to the increase of exhaust gases concentration in the atmosphere as one of the major causes of the global warming. Industrial plants and automobiles are the major source of the exhaust gases. Since they utilize the power associated with oil combustion as energy source. Emissions are simply the exhaust or leftovers of combustion coming out of an engine. An emissions test is normally done with a probe placed into the exhaust stream. Every road going vehicle has certain clean requirements that it is required to meet. The emission sampler, which is known as gas analysers, measures five types of gases. These gases are HC, NOX, O_2, CO, and CO_2. HC which refers to hydrocarbons, are simply another term for unburned fuel that makes its way through the engine and out the exhaust. Smog intensity is proportional to the amount of HC's in the exhaust. HC's is also considered hazardous when inhaled. NOX refers to oxides of Nitrogen. High NOX emission is usually noticed with highly heated and compressed air that has nitrogen in it. NOX is another bad emission to breath at high levels. O_2 which is unburned oxygen in the exhaust is also measured.

Although O_2 is obviously not bad, it is tested to better understand the combustion characteristics. Knowing the percentage of oxygen in the exhaust one may estimate the air/fuel ratio of the engine as it runs. CO and CO_2 refer to carbon monoxide and carbon dioxide respectively. Odourless CO causes headaches and eventually death by hold up O_2 from the human body, if it exists in high quantities. CO_2 is present in the air in large amounts contribute to green house effect and consequently global warming. HC's are usually the worst problem for vehicle engines. Many things can produce high HC's such as advanced timing, and bad catalytic converter. NOX is generally worse on higher compression engines. All engines produce NOX but the use of Exhaust Gas Recirculation Valve (EGR) valves will cool and slow down the combustion rate of the engine.

This considerably lowers NOX values CO has to do with the efficiency of the combustion in the engine and also is highly affected by the fuel to air ratio of the engine. CO_2 is also an indicator of the engines set up. The HC's and NOX are by far the largest problem areas. Catalytic converters clean the majority of the emissions and need to be replaced when they break internally causing a loss in power and no longer effective.

A shift in scientist's interests, recently observed, toward lower fuel consumption and emission engines take place. This encourages researchers to seek for alternative solutions to be used in engines without the need for a dramatic change in the vehicle design.

Among those using H_2 as an alternative fuel which enhances the engine efficiency and runs with almost zero pollution effect. However, this is not a viable solution from a commercial point of view. Building a system that generates H_2 and integrated it with the engine system makes the manufacturing cost too expensive, which reflects on the vehicle market price.

The main objective of the present study is to introduce some of the hydrogen advantages and maintain the original specifications of the engine. This may be attained by introducing H_2 cell to the fuel supplying system. So, the fuel becomes a mixture of gasoline and H_2 gas. A compact unit for generating H_2 gas has been designed to fit the engine requirement and to be installed in the engine room.