

AVERAGE IMPROVER KIT FOR I.C.ENGINE

Mr. Vidhate Saurabh Sumant¹, Mr. Naik Archit Uday²,

Mrs. Chaudhari Swati³, Mr. Ade Gopal⁴, Mr. Ankit Kumar⁵

^{1, 2, 3, 4} *B.E. Mech. Dept. B.V.C.O.E&R.I. NASHIK(India)*

⁵ *Asst.Professor, Mech. Dept. B.V.C.O.E&R.I. NASHIK (India)*

ABSTRACT

Today the world is facing three critical problems: 1. high fuel prices, 2. climatic changes, and 3. air pollution. Experts suggest that current oil and gas reserves would suffice to last only a few more decades. Bio-renewable liquids are the main substitutes to petroleum-based gasoline and diesel fuel. These fuels are important because they replace petroleum fuels; however, some still include a small amount of petroleum in the mixture. There are four alternate fuels that can be relatively easily used in conventional diesel engines: vegetable oil, biodiesel, Fischer-Tropsch liquids, and di-methyl ether. The main alternate fuels include (m) ethanol, liquefied petroleum gas, compressed natural gas, hydrogen, and electricity for operating gasoline-type vehicles. Bio-ethanol is an alternate fuel that is produced almost entirely from food crops. The primary feedstock of this fuel is corn. Bio-hydrogen is an environmentally friendly alternative automotive fuel that can be used in an internal combustion engine.

I. INTRODUCTION

The average ICE has efficiency between 20 to 30%, which is very low. If we see a heat balance sheet of the internal combustion engines for a spark ignition or gasoline engine we find that the brake load efficiency is between 21 to 28%, whereas loss to cooling water is between 12 to 27%, loss to exhaust is between 30 to 55 %, and loss due to incomplete combustion is between 0 to 45%. What is required is a simple and inexpensive system which overcomes the problems associated with the prior art devices. Most particularly, this system should include a sealed chamber, to prevent the electrolytic solution from being lost to effects other than electrolysis. In addition, the device should include electrodes which are located well beneath the surface of the electrolytic solution, to allow the electrolytic solution to be used up without exposing the electrodes. Further the system should include an automatic shut off switch to cause the unit to stop in the event the liquid level gets low enough to expose the electrodes. In addition, most preferably the device will conduct electrolysis in a low resistance electrolysis fluid, permitting it to operate at relatively low temperatures to prevent damaging heating and cooling cycles which can impair seal integrity. As well the device should have any joints or openings in the sealed chamber formed above the highest liquid level in the chamber. In this manner, even if a leak develops, the leak will simply allow additional air into the electrolysis chamber rather than leaking out electrolytic solution. Lastly, the system should preferably compensate for loss of liquid water to decomposition to prevent over concentration of the solution, which can lead to a higher resistance cell and excessive heat generation.

Around the world, this gas powers more than 5 million vehicles, and just over 150,000 of these are in the American usage is growing at a dramatic rate. On top of these benefits, this kit has also greatly improved on the original design, managing to achieve consistently higher mileage. The basic impact that the H₂O gas (brown gas as it is also called) has on the gasoline is that it reduces drastically the size of the fuel droplets. With smaller size, the reactivity of the fuel greatly increases, resulting a more complete and efficient burn. While the benefits of the first feature are obvious, the second one insures that heat dissipation is reduced to a minimum. The energy therefore is spent on useful force. The minimum improvement that this system has achieved is in the 20 -50% range. The technology is here, it is safe, environmentally friendly, has tangible benefits and is proven to increase your fuel efficiency.

II. LITERATURE REVIEW

Modern gasoline and diesel engines are much more efficient and less polluting than similar engines of even a few years ago. However, due to the increased number of vehicles in use, levels of air pollution continue to rise even in light of more efficient and clean running vehicles. Therefore, there has been increasing pressure to develop vehicles which have lower emissions, and thus are less polluting than conventional automotive technology permits. For example, under certain government "Clean Air" legislation, a certain number of vehicles are required to be emission free. This legislation has put pressure to develop alternate fuel technologies including electric cars and vans, natural gas and propane fuelled vehicles, hydrogen cell vehicles and the like. While a number of these technologies are promising, some are still a long way from commercial implementation, and others appear to have reached the limit of present design capabilities without yielding a consumer acceptable product. Therefore, attention has refocused on conventional gas and diesel burning engines, to try to develop a more pollution free and efficient combustion system. In the past, it has been discovered that the use of hydrogen and oxygen as a fuel additive increases the efficiency of an internal combustion engine and reduces pollution considerably. Both advantages appear to be the byproduct of faster flame speed that is as much as 9 times that of gasoline, resulting in more complete combustion of the fuel in the combustion chamber, with the resultant reduction in soot (semi-bituminous hydrocarbons) and other pollutants such as nitrous oxide, carbon monoxide, and an increase in output energy for a greater fuel efficiency and horsepower. The motor is comprised of two pistons, on either side of a single combustion chamber. Instead of using a crankcase to convert linear piston movement into rotational energy to turn a driveshaft or conventional electric motor, the pistons are mounted on air springs that generate electricity directly as they move back and forth.

III. PRINCIPLE

An electrical power source is connected to two electrodes, or two plates (typically made from some inert metal such as platinum, stainless steel or iridium) which are placed in the water. Hydrogen will appear at the cathode (the negatively charged electrode, where electrons enter the water), and oxygen will appear at the anode (the positively charged electrode). Hydrogen kit works on the principle of electrolysis of water. Where hydrogen gas produced is used to combust the petrol in the engine and hence increases the fuel efficiency of the vehicle.

IV. THEORY OF WATER ELECTROLYSIS

The electrolysis of water is considered a well-known principle to produce oxygen and hydrogen gas. In Fig.1 a schematic of an electrochemical cell is presented. The core of an electrolysis unit is an electrochemical cell, which is filled with pure water and has two electrodes connected with an external power supply. At a certain voltage, which is called critical voltage, between both electrodes, the electrodes start to produce hydrogen gas at the negatively biased electrode and oxygen gas at the positively biased electrode. The amount of gases produced per unit time is directly related to the current that passes through the electrochemical cell. In water, there is always a certain percentage found as ionic species,

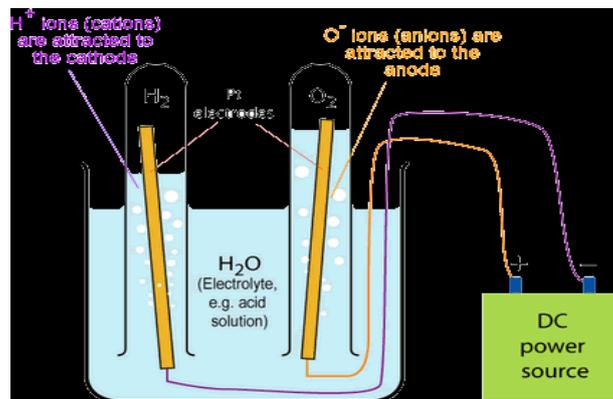
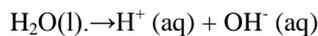


Photo. 2 Layout of an electrochemical cell

H⁺ and OH⁻ represented by the equilibrium equation:

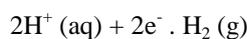


Oxygen and hydrogen gas can be generated at noble metal electrodes by the electrolysis of water:

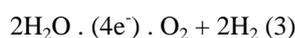
+ electrode (anode):



- electrode (cathode):



In case of acidic or basic water, the reactions which occur at the electrode interface are slightly different. In water electrolysis there are no side reactions that could yield undesired byproducts, therefore the net balance is:



The minimum necessary cell voltage for the start-up of electrolysis, E_0

cell, is given under standard conditions (P, T constant) by the following equation:

$$E_{0\text{cell}} = n_f G_0$$

Where, G_0 is the change in the free energy under standard conditions and n_f is the number of electrons transferred. In the case of a closed electrochemical cell, the conditions slightly change from standard

conditions, open cell (P, T) = constant to closed cell (V, T) = constant because the change in the cell volume is smaller compared to that of pressure. Therefore, instead of ΔG_0 , ΔA_0 free energy (Helmholtz) is used. The necessary voltage for an electron to overcome the Helmholtz energy barrier is given below:

$$E_{0\text{cell}} = n_f A_0.$$

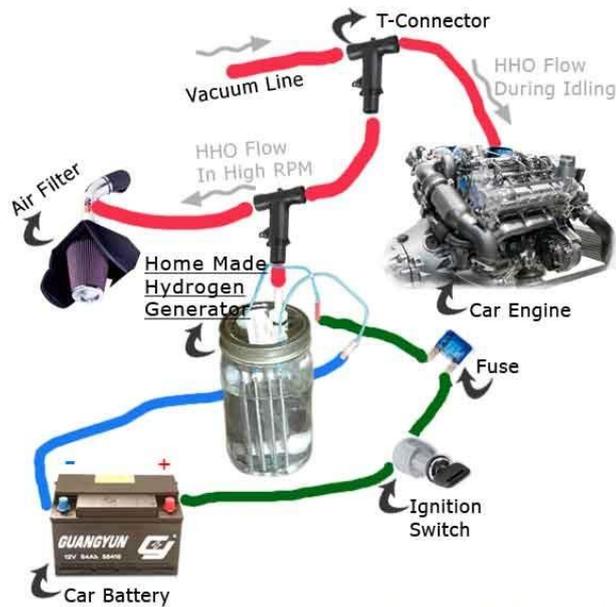
The activation over potential increases by increasing the current density and can be lowered by using electrodes which have a catalytic action, such as platinum.

V. EXPERIMENTAL SETUP & DESCRIPTION

Accordingly, there is provided an electrolysis cell according to the present invention comprising:

- a sealed plastic body,
- an outlet vent on the body,
- an inlet vent on the body,
- a first terminal located at a top of said body,
- a second terminal located adjacent to said first terminal,
- an insulated conductor associated with each terminal extending through said body and towards a bottom end thereof,
- an anode operatively connected to one of said terminals and
- a cathode associated with the other of said terminals, said anode and said cathode being spaced apart from one another within said body.

Despite the fact that the discovery of electrolytic water decomposing was first observed in acidic water, in industrial plants the alkaline medium is preferred, because corrosion is more easily controlled and cheaper construction materials can be used compared to acidic electrolysis technology. Other methods of hydrogen production, such as proton exchange membrane electrolysis, steam electrolysis have been developed in recent years. Hydrogen could also be generated as a byproduct.



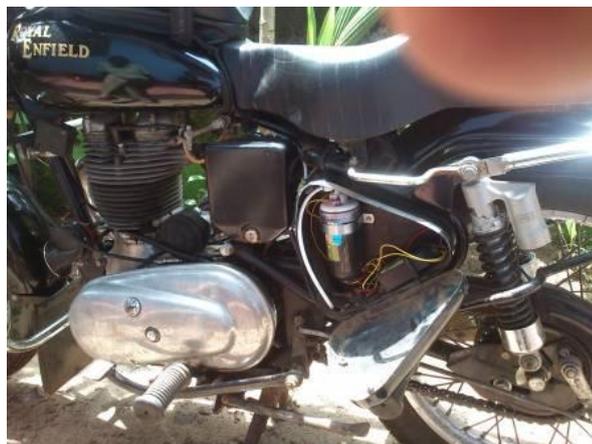
General layout of system

An electrolysis cell and internal combustion engine kit including an electrolysis cell is disclosed. The cell includes a sealed plastic body having an inlet and an outlet. The plastic body includes a first terminal located at the top of the body, a second terminal located adjacent to the first terminal and insulated conductors associated with each terminal extending through the body and towards the bottom end thereof. Each terminal ends in a respective anode and cathode which are operatively connected to the terminals. The anode and cathode are spaced apart from one another within the body. When an electrolysis solution is placed in the body, and a current provided across the electrodes, water is caused to decompose into hydrogen and oxygen. These combustible gases are then passed into the internal combustion engine to increase the efficiency and power thereof. In one embodiment a reservoir is provided to ensure that the level is maintained in the cell. This kit is a helpful agent in reducing the fuel consumption and increasing the efficiency of the engine without any adverse effect on the performance of the vehicle.

The H₂O kit separates Oxygen and Hydrogen from the water and hence hydrogen gas is used as the fuel to propel the vehicle causing less use of fuel. The Oxygen helps in burning the fuel and hydrogen burns itself thus having full control on the fuel consumption. The HHO kit automatically manages the injection of fuel into the engine. The oxygen is released into the environment and hence it is environment friendly.

- Reduce your fuel spending up to 20%. This is valid for both highway and town (city) driving conditions.
- Increases the power and performance in your car. The more fuel you burn, the more the engine gets rattled up and wrecked. Once you switch to supplemental hydrogen, it will enhance power and performance in your car.
- Reduces the CO₂ emissions. Eliminating pollution and other harmful residues that our car engines produce. What's wrong with doing also something good for the environment besides saving money?
- Reduces the temperature in the engine. Also improves engine life-span since its burning fuel at a much cooler state.

- Removes the carbon residues inside your engine and prevent future carbon deposits.
- Lower noise and vibrations in the engine. Hydrogen effect in the combustion cycle. The engine will sound much quieter than it was before. This is due to higher combustion efficiency in your car.
- Increases the life span of your engine.
- The price of the petrol, diesel, gas and other fuel products are inflated in India and a normal has to think twice before going to have a vehicle out of his home. The prices have touched the sky in the recent past. Everyone thinks and raises a question "*Can it be possible to cut down the fuel prices?*", the other meaning of the question is whether it would be possible to run the vehicle with less fuel and more mileage.
- You will be glad to know that the day has arrived when it is possible to increase the mileage of the vehicle now using the H₂O Kit. This kit is a supplement to the fuel as it helps in reducing the consumption of fuel by providing energy to run the vehicle on water.
- It is possible to run a vehicle on water!
- At present the researches are being carried on and might be in the future, but for now we can prove that the vehicle can run on water when the H₂O Kit is installed in the vehicle. The installation of this kit does not mean that the fuel is no longer needed. As already told that the water can be used to supplement the fuel.
- How H₂O Kit Works?!
- The H₂O Kit uses the battery of the vehicle and help the electrical system to electrolyze water into gaseous combination of hydrogen and oxygen also called Brown's gas or H₂O or Oxyhydrogen. Since the chemical structure of water is H₂O i.e. two atoms of Hydrogen and One atom of Oxygen makes water, hence the mix is in the ratio of 2:1
- H₂O Kit Works as a Catalyst!



Installation of kit

- In advanced stage H₂O burns too fast by itself and actually works better if it is "slowed down" by the gasoline, diesel, CNG, LPG, or biodiesel fuel etc. which makes it perfect in a gas saving application, where it can burn the fossil fuels faster, extracting more energy out of it inside the engine, instead of having to filter or convert it.
- Our H₂O kits are comprised of a robust, on demand hydrogen generator, an external water/electrolyte reservoir, and a bubbler/filter mechanism. The kit does not need a tank to compress or save the gases in,

but uses them as they are made ("on demand"). It operates on the available extra energy of the car alternator, and generally uses less than 500 watts of energy to operate.

VI. OBJECTIVES

The objective of this project is to provide a means of renewable hydrogen based fuel utilization. The development of a high efficiency, low emissions electrical generator will lead to establishing a path for renewable hydrogen based fuel utilization..

VII. CONCLUSION

In this project the major benefits is engines with higher efficiency can be designed. We also conclude that the use of petroleum is reduced resulting into less pollution and emerging into a next generation of automobiles which are pollution free.

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