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### Fabrication of button operated electro-magnetic gear shifting system and increasing the efficiency of IC engine by using hydrogen fuel

T. Venkateshan<sup>1</sup>, M. Manoj<sup>2</sup>, S. Pravin Kumar<sup>2</sup>, R. Prakashbabu<sup>2</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>UG Students

Department of Mechanical Engineering, Nandha Engineering College, Erode-52, Tamil Nadu, India.

#### ABSTRACT

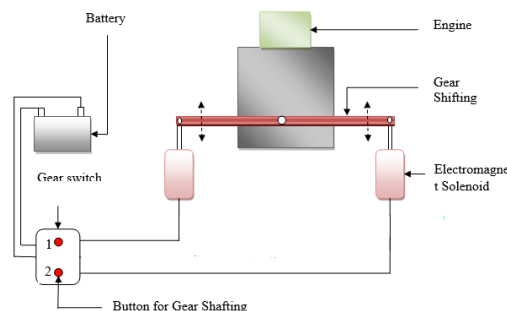
In this gear shifting mechanism, gear shifting is done with the help of the solenoid plungers. The up shifting and downshifting of gears is done with the help of two independent switches. These two switches are connected to solenoid. The two buttons used to activate the electromagnetic coil so that the gear will be shifted. Hydrogen powered engines have been in development for the past decade. While hydrogen fuel been receiving the majority of the attention, they will not be for mass production for fifteen to twenty years. Hydrogen internal combustion engines may prove to be the most effective solution for the immediate future. This project explores the feasibility of making hydrogen internal combustion internal engine and increasing the efficiency.

**Index Words:** Solenoid, Electromagnetic coil, Hydrogen gas, IC Engine

#### INTRODUCTION

Gear change control apparatus for an automobile comprising an internal combustion engine an automatic transmission connected to an

output of drive wheels through any selected one of gear ratios apparatus comprising a load device for applying a load means for connecting load device to output rotation.



**Fig. 1 Block diagram of gear shifting system**

Shaft of engine transmit rotational output of drive wheels through any selected one of gear ratios for connecting load device to output rotation shaft of the engine and for generating a gear change control signal for selecting one of gear

ratios of shaft of engine and for generating a gear change control signal for selecting one of gear ratios of automatic transmission in accordance with one of the operational conditions of automobile and load control means for increasing

**Author for correspondence:**

Department of Mechanical Engineering, Nandha Engineering College, Erode-52, Tamil Nadu, India.

the load of said load device when said gear change signal-generating means control signal for shifting up the gear in automatic transmission. This project is used to develop a mechanism of an electromagnetic shift arrangement for a transmission with gear wheels arranged on a gear shift rotatable about an axis, which will make the motor bike riders gear shifting easy.

Hydrogen powered bikes are those in which "HYDROGEN CELL" is used to produce a fraction of power for driving the bike. This results in decrease the fuel (petrol) thus increasing the mileage of the bikes. Hydrogen gas kit is latest innovation to increase mileage and power of vehicle. Combustion of fossil fuels has caused serious problems to the environment and the geopolitical climate of the world. The main negative effects on the environment by Fossil fuel combustion are emissions of NOx, CO, CO2, and unburned hydrocarbons. The main negative effect of burning fossil fuel on the geopolitical climate is the lack in supply of these fuels and the effect pollution has on politics. Hydrogen is a clean fuel which on combustion produces water vapor as the only product. The use of hydrogen in IC engines not only help increase the efficiency of it but also it helps to reduce pollution and reduce the poisonous gases like carbon monoxide, nitrous oxide etc. The use of hydrogen helps to reduce their use and hence prevent the depletion of these precious natural resources. Through a process of electrolysis water that is in a sealed container under your hood is converting to HO gas.

## LITERATURE SURVEY

[1] D. Mangeelal et al, told that when a gear shifting-up of an automatic transmission is to be effected, the load applied by the load device is increased, or the load is connected to an output rotation shaft of the engine through a selectively-connecting device, thereby reducing the rotational speed of the output rotation shaft of the engine to a required level.

[2] P.L. Kohli et al, told that this project aims at developing a very easy mechanism of an electromagnetic shift arrangement for a transmission with gear wheels arranged on a gear shift rotatable about an axis, which will make the motor bike riders gear shifting very easy.

[3] Aaditya abhishek et al, told that It is advantageous to use Brown's gas enriched air as a fuel in internal combustion engines. Significant impact on brake thermal efficiency and brake power is observed upon the addition of Brown's gas enriched air.

[4] Siddesh Rao et al, told that Hydrogen as a fuel plays a great role in the reduction in exhaust emissions in both SI as well as CI engines in the present scenario of stringent emission norms. The emission control technologies for both engines have reached to their minimum level using various techniques and hydrogen can have a greater potential considering future emission norms.

## ELECTROMAGNETIC COIL

An electromagnetic coil is a device comprising two distinct elements that is a conductor and a core. The conductor is most commonly made from solid copper wire, which is wrapped around a solid metal core. Each time the wire is looped around the core, it is called a turn. Multiple turns are considered to be a coil. The most common use of an electromagnetic coil is that of an inductor that stores energy within its magnetic field. Considered a passive electrical component, an inductor has no gain and cannot control the directional flow of the energy. The way an inductor harnesses energy is by the electric current passing through its body. This reaction is due to Faraday's law of induction, which states that "the induced electromotive force or EMF within a closed circuit is equal to the time rate of change of the magnetic flux through the circuit." As one of the basic components of electronics, inductors delay and reshape alternating currents.



**Fig. 2 Electromagnetic coil**

## HYDROGEN POWERED ENGINE

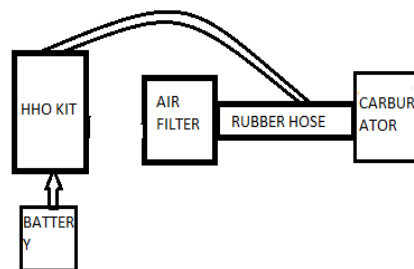
### Working Principle

This works on the principal of electrolysis process. Electrolysis is the process that converts water to gas. The electrical supply for the process is used from your Vehicles battery and alternator. An electrical power source is connected to the two electrode materials 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 material (the positively charged electrode) that is the reduction at cathode and oxidation at anode occurs According to ideal faradaic efficiency. The amount of hydrogen generated is twice the number of moles of oxygen and both are proportional to the total electrical charge conducted by the electrodes solution.

### Working Process

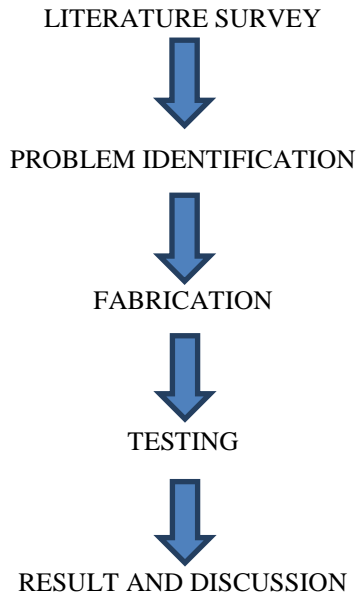
The hydrogen generated at cathode is fed to the inlet manifold that is in air hose pipe of the

carburetor, then this gas mix with the coming air from the air filter when the vacuum is created by the piston movement from TDC to BDC. As the hydrogen or HO gas mixed with air then it goes to engine cylinder with gasoline during suction stroke of the engine. At the end of compression stroke the spark is generated from the cold rated spark plug the combustion of gasoline and HO gas occurs. HHO itself contains 1/3 oxygen by volume and 2/3 hydrogen (which has an octane rating of 130. The hydrogen explosion is so fast that it fills the combustion cylinder at least 3 times faster then the gasoline explosion and subsequent ignites the gasoline from all directions. Hence more power is generated consequently the mileage of our bike gets increased. Some basics the burn speed of hydrogen is 0.098 to 0.197 ft/min (3 to 6 cm/min) compared gasoline's 0.00656 to 0.0295 ft/min (0.2 to 0.9 cm/min).



**Fig. 3 Block diagram of hydrogen powered supply**

## METHODOLOGY



### PROBLEM IDENTIFICATION

There is currently no option for manual override when the battery is exhausted. This could be a problem for riders while riding the bikes. So while using the derailleurs battery we can transmit the power from direct source. By this we can reduce the manual override when the battery is exhausted. The threat posed by climate change and the striving for securities of energy supply are

issues high on the political agenda these days. Governments are putting strategic plan motion to decrease primary energy use, take carbon out of fuels and facilitate modal shifts. Taking a prominent place in these strategic plans is hydrogen as a future energy carrier. So the hydrogen gas combined with the standard air/fuel mixture increases the mileage.

### Fabrication



Fig 4. Arrangement of electromagnetic gear changing system.

### CONCLUSION

In the fabrication of hydrogen powered IC engine the results are shown below Without Hydrogen

**Table. 1. Experimental Values of fuel without hydrogen**

TRAIL NO	AMOUNT OF GASOLINE CONSUMPTION	DISTANCE COVERED
1	100 ml	5.2 km
2	200 ml	10.4 km

The above table indicates the performance details of usage of the gasoline (petrol). Further, the performance analysis of gasoline along with the hydrogen gas has to be done by means of single mode and hybrid mode and results will be compared to increase the efficiency.

This project is made with pre-planning, that provides a lot of practical knowledge regarding, planning, purchasing, assembling and machining. The application of electro-magnetic coil produces

smooth operation. Even though the initial cost of button operated electro-magnetic gear shifting system is very high, but it is very much useful for two wheelers, car owners & auto-garages. By using more techniques, this design can be modified and developed according to the applications. This project also helped us to know the periodic steps in completing a project work. And let to know the strength of team work.

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