

FUEL LESS ENGINE BY ELECTROMAGNET

J.Rahul¹, J.S.Veera jagatheeshwaran²

^{1,2}Pg student, Department of Mechanical Engineering
Saranathan College of Engineering, Tiruchirapalli, Tamilnadu, India

Abstract - Increasing fuel prices and pollution are the major demerits of Internal Combustion engines. Also presently the demand for fuel has increased. So there is a need of alternative energy has become necessary. The main aim of the project is zero point fuel consumption. Electro magnets are mounted on the cylinder head and the permanent magnets are mounted on the piston head. Here not using spark and valve arrangement. Electromagnet contains copper windings. Electro magnets are getting power supply from the battery by suitable voltage. The piston contains permanent magnet moves from TDC to BDC and BDC to TDC which will result, convert reciprocating motion into rotary motion of crankshaft. The working principle of the engine is the magnetic force principle, i.e. magnetic repulsion between the same poles of two different magnets. When similar poles of two different magnets come in contact with each other they repel each other. This phenomenon of repulsion is used in this engine to create motion. Using this principle, the power is transmitted to the flywheel that is in tuned delivered to the wheels of the vehicle. Here electromagnetic force is used to generate mechanical power.

Key Words: magnetic force, windings, reciprocating, electromagnets, repulsion.

1. INTRODUCTION

IC engine make use of gasoline and diesel. Due to pollution, every year there are around 50 million automobiles are manufactured. So there is rise in use of fossil fuels, so there is a demand of fossil fuels. Due to demand of fossil fuels cost of fuel rises up. So there will be a need of switching to alternative. The alternative of IC engine is "Electromagnetic Engine". The general property of magnet attraction and repulsion force in converted into mechanical work. The magnetic driven engine derives its power from magnet and constant magnetic energy is converted into mechanical energy. The useful output is rotating motions and the application is based on electromagnetic engine which varies from different field.

The electromagnetic engine should ideally perform exactly the same as the internal combustion engine. This engine, the strength of the field is controlled by amount of windings. This design applies the power every two stroke as normal does now. This engine eliminates fuel line and cooling system.

The main advantages of electromagnetic engine are that it is pollution free and internal parts like valves and cam-

followers can be avoided. Also no manifolds are required since there is no fuel flow. The challenge faced in designing and electromagnetic engine that is has to be as efficient as an internal combustion engine.

2. COMPONENTS AND DESCRIPTION

2.1 Cylinder

Main function of cylinder in IC engine is to keep working fluid within a close region as well as to work as a guide for piston. The working of cylinders is very intense because they have to bear combustion temperature of the fuel as well as the vibrations produced due to the result of combustion. For this reason, we use cast iron as material and to keep the temperature of cylinder within working limit.

The cylinder of an electromagnetic engine is a simple rectangular block. The temperature within the electromagnetic engine cylinder is very low and so no fins are needed for heat transfer. This makes the cylinder easily manufacture. Also the cylinder is made of aluminum, a non-magnetic material which limits the magnetic field within the boundaries of cylinder periphery Usage of aluminum material makes the engine lighter unlike cast-iron cylinder used in internal combustion engine.

2.2 Piston

The piston is the reciprocating part of an engine. The permanent magnet attached in the piston and the electromagnet attached in the cylinder creates a magnetic force which drives the crankshaft with the help of the connecting rod. At the piston top, few grooves are cut to accommodate the piston rings and the bands left between the grooves are known as lands.

2.3 Flywheel

Flywheel is made up of mild steel and it is used to convert reciprocating energy into rotational energy. It regulates the engine's rotation, making it operate at a steady speed. Flywheels have a significant moment of inertia and thus resist changes in its rotational speed. The amount of energy stored in a flywheel is proportional to the square of its rotational speed. Energy is transferred to the flywheel by applying torque to it. It is used to store the rotation kinetic energy.

2.4 Electromagnet

An electromagnet coil is formed when a insulated solid copper wire is wound around a core or form to create an inductor or electromagnet. When electricity is passed through a coil, it generates a magnetic field. One loop wire is usually referred to as a turn or a winding, and a coil consist of one or more turns. For use in an electronic circuit, electrical connections terminals called taps are often connected to a coil. Coils are often coated with varnish or wrapped with insulating tape to provide additional insulation and secure them in place. A completed coil assembly with one or more set of coils and taps is often called the windings.

2.5 Permanent magnet

Types

- NdFeb (Neodymium-Iron-Boron)
- Ferrite (Ceramic)
- AlNiCo (Aluminum-Nickel-Cobalt)
- SmCo (Samarium Cobalt)
- Bonded (Flexible)
Neodymium-Iron-Boron magnet is used in this project. Because this magnet have higher performance than other magnets.

2.5.1 Neodymium Iron Boron

The most powerful 'rare-earth' permanent magnet composition known to mankind and our specialty, This formulation is relatively modern, and first became commercially available in 1984. NdFeB magnets have the highest B & Br of any magnet formula, also have very high Hc. They are however very brittle, hard to machine, and sensitive to corrosion and high temperatures. Useful in the workshop, pickup truck, laboratory, wind turbine, starship. In power generations applications, NdFeB magnets can be expected to give 4-5 times the power output of ceramic magnets. The strength of a magnetic field is measured in units of Gauss (G), or alternatively, in Tesla (T). In MKS (metric) system of units, $1\text{ T} = 1\text{ kilogram}\cdot\text{ampere}/\text{second}^2 = 10^4\text{ G}$.

2.6 Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts.

2.7 Timer 555 IC

The 555 timer is an integrated circuit (chip) used in variety of timer, pulse generation, and oscillator applications. The 555 timer can be used to provide time delays.

2.8 Battery

Lead acid cell is the most commonly used type of battery when high value of load current is necessary. In this engine 48V lead acid battery is used.

3. WORKING PRINCIPLE

The working principle of the electromagnetic engine is based on attraction & repulsive force of the magnet. The working of the magnetic engine greatly resembles the working of the two-stroke engine. To start, let us begin from situation, when the piston is located in the lower position.

The coil is connected through battery, the copper coil is energized to produced the magnetic field the piston in side of the large power Neodymium Iron Boron magnet, the piston moves upper (BDC to TDC) and lower the flywheel connected through the piston link the copper coil energized the piston move upward and copper coil is reenergized the piston moves downward (TDC to BDC). With the help of relay and timer, the continuous process through piston in achieved (up and down) by also rotating the flywheel.

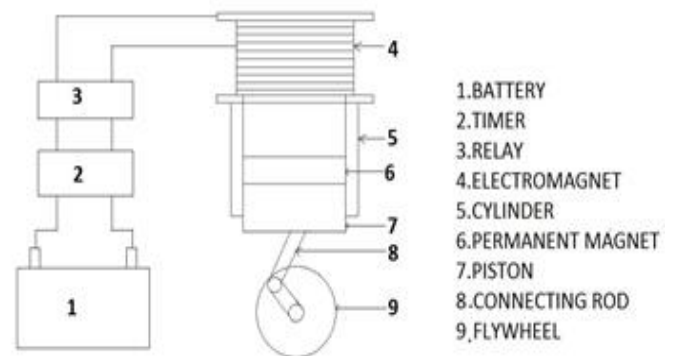


Fig -1: 2D view of fuel less engine

3. CONCLUSIONS

The existing engines can be easily modified to work this way. This engine design is very simple. The electromagnetic engine has many advantages than internal combustion engines. The main advantage is zero point fuel consumption. This results in no pollution. As there is no combustion takes place inside the engine cylinder there is only little heat generation. So there is no need of cooling systems. Hence it reduces the weight of the engine. This engine does not produce noise. The disadvantage of this engine is the power of the permanent magnet will decrease, so we have to replace the permanent magnet during regular intervals. And this engine is not suitable for heavy duty vehicle because load pulling capacity of this engine is very poor.

REFERENCES

- [1] Shirsendu Das, "An electromagnetic mechanism which works like an engine" International journal of engineering Trends and Technology, vol.4, June 2013.
- [2] Amarnath Jayaprakash, Balaji.G, Bala Subramanian.S and Naveen.N "Studies on electromagnetic engine" International Journal of Development Research, vol.4, issue 3, p.p. 519-524, March, 2014.
- [3] J.Rithula, J.Jeyashruthi and Y.Anandhi, "Electric vehicle with zero-fuel electromagnetic automobile engine" International Journal of Engineering Research and technology, vol.6, pp. 483-486, 2013.
- [4] Muralidharan.K, Nagraj Shakthivel Nadar, Karthikprabhu.T, "Study of electric reciprocating engine" International Journal for Scientific Research & Development, vol.4, issue 06, 2016.
- [5] V.Ganesan; Tata McGraw-Hill Education; "Internal Combustion Engines"
- [6] C.R.Dasgupta, Basic concept of electromagnet and electromagnetism from text book of physics.
- [7] www.howmagnetnetworks.com