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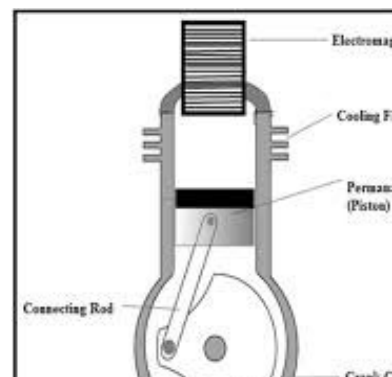
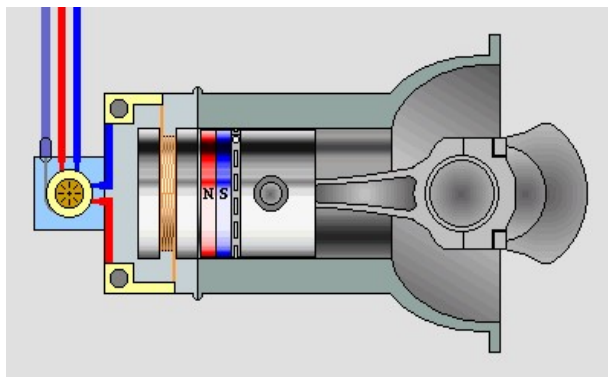
# ADVANCEMENT AND IMPROVEMENT IN ELECTROMAGNETIC ENGINE

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## Abstract

The paper represented as a new methodology for forming “green engine” which obey the fundamental principles of nature. This technology predicts the coming future which opens the entrance of new form of energy as electromagnetic energy. The EM engine can replace the fuel based engine (IC engine) with much more power and efficiency touching 90%. Main aim of the paper is to design a way to increase the power and efficiency of EM (electromagnetic engine) engine. EM engine is a mechanical device which performs motion on the basis of electromagnetic force. EM engine does not requires valve system, fuel burning or spark plugs. EM engine works on the principle of faraday’s law of electromagnetic force. In this era fuels such as petrol, diesel are going to end within a decade of years as of more demand is increasing day by day. For future requirements we have to find a free zero fuel energy which can solve all problems of the existing one and should be limitless by nature. Magnets are consider to be nature friendly elements which are non pollutant and can be used to produce zero point friction which in turn controls the losses of mechanism Used in the engine. EM engine is both eco friendly and does not require any spec ialization like in IC. Keywords: electromagnetic force, IC engine, magnets, green engine, fuel and efficiency engine.

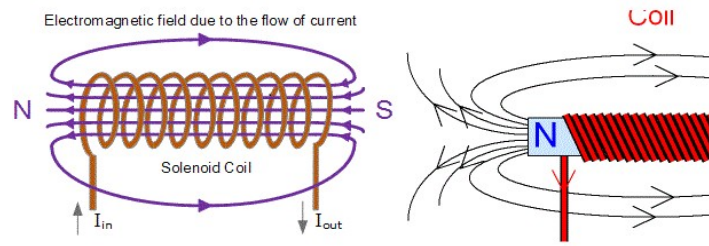


## Introduction

The paper represents electromagnetic piston mechanism which requires electric magnetic fields instead of fuel. In this engine no combustion is requires. EM engine requires a small input,

producing high efficient work. Basically the engine converts electrical and magnetic energy as input into mechanical work as reciprocating motion of piston. The design consists of electromagnet (cylindrical super conductor), strong super magnets, connecting rod and crank. The principle is based on magnetic levitation which requires strong stabilized electromagnetic field for lifting [1]. No friction is produced in the mechanism except small values (in connecting links of the mechanism), that is not reached to zero friction but close to it. This principle is used in bullet train and coming futuristic train “THE HYPER LOOP” (vacuum based magnetic levitating train). Electromagnetic fields are non- contact in nature and is the strongest force than gravitational force with an order of  $10^{39}$  times. They are not harmful like electric current that is human friendly as well as eco friendly in nature. EM waves can produce antigravity that is can be used as electromagnetic propulsion. Electromagnetic engine can adjust output according to the speed, load and power. It is pretty much efficient engine. EM engine does not require that much maintenance like IC engine or steam engine.

#### Electromagnet vs. permanent magnet

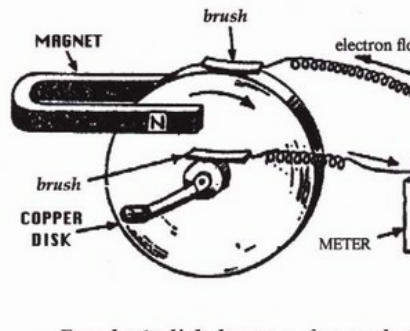
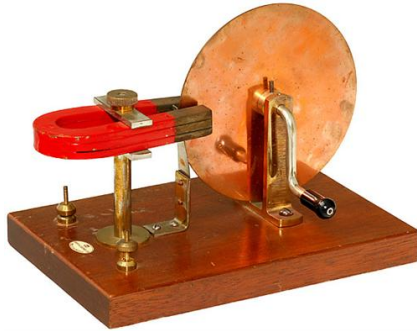


Magnetic fields also play very important role in the engine which produces an opposing force to move the piston to and fro motion. Magnetism can be produced in permanent as well as temporary form. Permanent magnet requires residual magnetism and temporary magnetism is achieved by passing AC through soft iron core. Permanent magnets are quite stronger than electromagnets. Electromagnetic intensity is more torrid than solenoid due to magnetic flux. Magnetic field can also produce induced current that is AC induced voltage which can be used in generator, cyclotron energy accelerator and antigravity. AC voltage can be produced by magnetic induction which is used in EM engine as a generator.

#### Literary survey

The concept was first seen in 18th century by a great scientist “Michael Faraday” and then in 19<sup>th</sup> century by the great inventor “Nicola Tesla” known as THE FATHER OF ELECTRICITY. After the invention of magnetism faraday started working on electromagnetic theory in which he performed lots of experiments. He wound a copper coil in soft iron core and passed high frequency alternating current. He observed that a magnetic field is produced around the coil. He then proved that there is something beyond magnetism which produces even a greater force than magnetism. He explained it by his great invention “UNIPOLAR DISC GENERATOR” that the copper plate or bar can produce stronger electromagnets than coil which in turn produce high electromagnetic field. After Faraday the great inventor NICOLA TESLA discovered 3 phase AC system for power transmission network. Tesla proved that magnetic levitation can be achieved by high electromagnetic frequency waves which can even produce antigravity system. He

experimented with the thick copper bars and magnets through which he constructed a copper based magnetic moor which is believed to be a free energy source that is without input energy it can run on its own. This research continues till today to know more about the EM waves.



Electromagnetic piston engine

Electromagnetic piston engine is an engine which works on the principle of electric and magnetic fields. Electromagnetic engine consist of components namely strong super magnet (arranged in hall batch array as piston head), electromagnet (low resistance copper torrid coil), connecting rod (aluminum), crank (mild steel) [4]. In this engine the electromagnet is place above the piston, the piston is made of super magnets which is linked to the connecting rod. The AC voltage source (generator) is connected to the coil. It is base on Lenz law which states that “when a magnet is moved to and fro in a solenoid it opposes the motion of magnet” that is the solenoid itself is acting as electromagnet which opposes the motion of magnet. The engine performs this action by Lenz law which in turn produces reciprocating motion. Torrid coil is used as electromagnet which produces strong magnetic field than that of normal solenoid. This engine can mainly useful in electric generator power plant, automotive as well as automobile industry much other application.

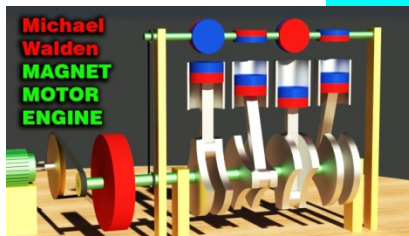
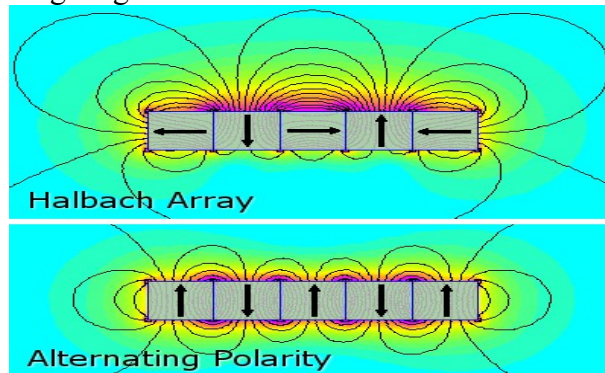
## Working

The electromagnetic engine is a reciprocating engine which works as a non combustible magnetic repulsion principle, that is faraday’s law of electromagnetic force. In this engine the torrid electromagnet produces the opposing magnetic field which moves the piston down ,the polarity of the AC source can be reversed so that reverse magnetic field is produced in order to attract the piston to move in upward direction[2]. So no need of sensor or timer system since it is controlled through AC source. The piston is made of piston head and piston rod, piston head is a strong super magnet which produces stronger magnetic fields than the electromagnet. The piston rod is made of non- ferromagnetic material (aluminum). The piston and the electromagnet are the main system to produce the mechanical energy to the crank which in turn transmit the power as work. Main component of the engine is the AC source which changes the polarity according to frequency and current. To prevent losses of the engine such as piston sliding loss, link loss, heat loss, and friction loss the design provides a little bit improvement. The cylinder is designed in such a way that the piston can slide in the cylinder producing less friction as compared to normal EM engine. The cylinder consist of small magnets placed in both sides of cylinder in (- N-S-N-S-

pattern ) which can move the piston slightly faster than before as the piston will not be in contact with the cylinder due to the magnetic field of the magnets in the cylinder. This principle is used in the bullet train for levitation purpose. This system will decrease the friction to a closer value to zero. EM engine can be used at a free cost of energy having long durability with use of magnets.

### Super permanent magnet

Super magnets (Ni Fe B) [3] are much stronger than the permanent magnets which are arranged in Halbach array which increases the magnetic flux density by a stronger range than a normal permanent magnet. In a permanent magnet the magnetic domains are arranged in a specific direction and if arranged in a particular domain pattern the field is increased with greater magnitude that is the magnetic field lines make more larger closed loops than a normal permanent magnet. Halbach array is very much important for producing stronger and more range magnetic fields. In EM engine the piston head is made of a super strong magnet using a Halbach array in order to produce that much strong and range magnetic force of attraction and repulsion for movement of piston. For vehicles such as car, truck large load and force is required that can be fulfilled by strong magnetic force.



### Future Scope

Electromagnetic engine requires a lot of future work. This engine can be made perpetual that is a free energy device that may not take any form of energy as input. This method can be achieved by making the piston as well as source to be eternal in nature. We can achieve it either by superconductors as their property of zero resistance in particular temperature for example: Cu666 (copper and niobium alloy) offers zero resistance at a temperature of  $-18^{\circ}\text{C}$ . Further if this temperature is increased, we will be close to room temperature operated superconductors. If superconductors are used in EM engine it can increase the efficiency as well as losses in the engine are nullified since heat losses are due to resistance. Even magnetic levitation is possible.

## Conclusion

EM engine is a green engine which cures a lot of disadvantages of internal combustion engine like losses produced in the engine, pollution, harmful gases released in engine [4]. EM engine requires less power as compared to IC engine. EM engine work both in AC as well as DC voltage source.

- 1) EM engine requires small input as energy for the movement.
- 2) EM engine does not require combustion since it is a fuel less engine.
- 3) It is consider as green engine. It does not pollute the environment like IC engine which pollutes the environment by incombustible gases.
- 4) EM engine produces power with much more efficient than IC engine by decreasing or increasing current produced by the source.
- 5) It does not require timer or sensor for the movement of piston and produces more propulsion for cars than IC engine.
- 6) Maintains friction losses produced by the engine by using non-contact force by the strong magnets placed in the cylinder by a particular arrangement (-N-S-N-S-N-).
- 7) Increases the efficiency of the engine by a factor of four due to electromagnetic force.

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