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Electro Magnetic Engine

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Abstract- ***The electro-magnetic engine is an innovative concept that converts electrical energy into mechanical energy using the principle of electromagnetism. In this system, electromagnets are used to create attractive and repulsive magnetic forces which produce linear motion of a piston. This motion is then converted into rotary motion through a crankshaft mechanism. Unlike conventional engines that depend on fossil fuels, the electro-magnetic engine works using electrical energy and does not produce harmful emissions. The main objective of this project is to develop a simple and efficient engine model that demonstrates the working principle of electromagnetic force. This system can be useful in future electric vehicles and energy-efficient machines where pollution- free energy conversion is required.***

Index Terms- ***Electromagnet, Magnetic field, Engine, Electric energy, Mechanical motion***

I. INTRODUCTION

An engine is a device that converts energy into mechanical work. Conventional internal combustion engines use fossil fuels such as petrol or diesel which cause environmental pollution and energy loss. Due to increasing environmental concerns and depletion of fossil fuels, there is a need for alternative energy systems.

The electro-magnetic engine is a modern concept which works on the principle of electromagnetism. In this system, electrical energy is used to generate magnetic force which moves a piston or rotor. The generated motion is converted into useful mechanical energy. This project demonstrates the design and working of an electro-magnetic engine model which operates using electromagnetic attraction and repulsion

II. PROBLEM DEFINITION

Traditional internal combustion engines mainly depend on fossil fuels such as petrol, diesel and natural gas. These fuels are limited in nature and their continuous use leads to depletion of natural resources. In addition, combustion of fossil fuels produces harmful gases such as carbon monoxide, carbon dioxide, nitrogen oxides and other pollutants which cause serious environmental problems. These emissions contribute to air pollution, global warming and climate change.

Another major problem with conventional engines is their lower efficiency and higher maintenance cost. Internal combustion engines consist of many moving parts and require regular maintenance, lubrication and fuel supply. The cost of fuel is also increasing continuously which makes traditional engines expensive to operate.

Therefore, there is a need to develop alternative energy systems which are environmentally friendly, economical and energy efficient. The electro-magnetic engine is one such concept that uses electrical energy and magnetic force instead of fuel combustion. This project aims to demonstrate the working of an electro-magnetic engine which can reduce pollution and dependence on fossil fuels.

III. LITERATURE SURVEY AND SPECIFICATION

Several studies and research works have been conducted on the use of electromagnetic principles to generate mechanical motion. Electromagnetic engines are considered as one of the alternative technologies that can replace conventional fuel-based engines in the future.

Researchers have explored different designs of electromagnetic actuators and electromagnetic motors to improve efficiency and performance. The basic concept behind these systems is the interaction between magnetic fields and electric current. When current passes through a conductor or coil, it produces a magnetic field which can exert force on nearby magnetic materials.

Many experimental models have been developed by researchers and engineers to demonstrate the feasibility of electromagnetic engines. These models show that magnetic attraction and repulsion can be used to produce linear or rotary motion. However, one of the major challenges in electromagnetic engines is improving the efficiency and power output.

In recent years, with the development of electric vehicles and renewable energy systems, electromagnetic technologies have gained more importance. Advanced materials and improved electrical systems can help in increasing the performance of electromagnetic engines.

IV. COMPONENTS USED

The electro-magnetic engine consists of several mechanical and electrical components which work together to convert electrical energy into mechanical motion.

Electromagnet:
An electromagnet is the main component of the system. It is created by passing electric current through a coil wound around an iron core. When current flows through the coil, it produces a magnetic field which attracts magnetic materials.

Battery or DC Power Supply:
The battery provides electrical energy to the electromagnet. It supplies the current required to generate the magnetic field in the coil
.
Copper Coil:
Copper wire is wound around the iron core to form a coil. Copper is used because it has good electrical conductivity and allows current to flow easily.

Iron Core:
The iron core strengthens the magnetic field produced by the coil. It helps in increasing the magnetic force generated by the electromagnet.

Piston:
The piston is a movable component which is attracted by the electromagnet. It converts the magnetic force into linear motion.

Connecting Rod:
The connecting rod connects the piston to the crankshaft and transfers the motion from the piston to the rotating shaft.

Crankshaft:
The crankshaft converts the reciprocating motion of the piston into rotary motion which can be used to perform mechanical work.

Switch:
The switch controls the supply of electrical current to the electromagnet.

Base Frame:
The base frame supports all the components of the engine and keeps the system stable during operation.

V. CONSTRUCTION

The electro-magnetic engine model is constructed on a strong and stable base frame. All the components are properly mounted on the frame to ensure smooth functioning of the system.

First, the electromagnet is fixed on the base frame at a suitable position. The copper coil is wound around the iron core to form the electromagnet. The piston is placed near the electromagnet so that it can move towards the magnet when current flows through the coil.

The piston is connected to a connecting rod which is further attached to the crankshaft. This arrangement forms a crank mechanism similar to that used in conventional engines.

The battery or DC power supply is connected to the electromagnet through a switch. When the switch is

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turned on, current flows through the coil and creates a magnetic field which attracts the piston.

All components are aligned properly to ensure smooth movement of the piston and rotation of the crankshaft.

VI. WORKING PRINCIPLE

The electro-magnetic engine works on the principle of electromagnetism. According to this principle, when electric current flows through a conductor, a magnetic field is generated around it. This magnetic field can exert force on nearby magnetic materials.

In this engine, when current passes through the copper coil, the iron core becomes magnetized and acts as an electromagnet. The magnetic field produced by the electromagnet attracts the iron piston placed near it.

As the piston moves towards the electromagnet, the connecting rod transfers this motion to the crankshaft. The crankshaft then converts this linear motion into rotary motion.

By controlling the supply of electrical current, the electromagnet can be activated repeatedly. This repeated attraction of the piston produces continuous movement and causes the crankshaft to rotate continuously.

Thus, the electro-magnetic engine converts electrical energy into mechanical energy without using fuel combustion.

VII. METHODOLOGY

The methodology followed in this project involves several stages including design, construction and testing of the electro-magnetic engine model.

First, the design of the engine model was prepared by selecting suitable components such as electromagnet, piston and crankshaft. The dimensions and positions of the components were carefully planned to ensure proper operation.

After designing the system, the base frame was constructed and the electromagnet was mounted on it. The piston and crankshaft mechanism were installed and connected using a connecting rod.

Next, the electrical connections were made between the battery, switch and electromagnet. Proper insulation and safety measures were taken while connecting the electrical components.

Finally, the system was tested by supplying electrical current to the electromagnet. The motion of the piston and rotation of the crankshaft were observed and analyzed.

The results obtained from the testing confirmed that electromagnetic force can be effectively used to produce mechanical motion in an engine system.

VIII. FIGURES

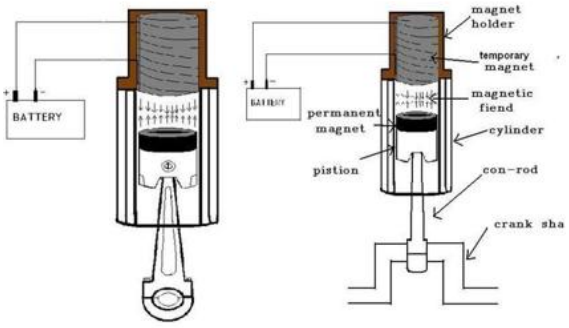

Diagram of Magnetic Piston Operated Engine

IX. CONCLUSION

Design and working of magnetic piston engine is different from another engine. The Principle of Operation of Electromagnetic Engine is Different than that of Internal Combustion Engine. The electromagnetic engine has various advantages over the internal combustion engines. The main advantage is, no fuel is being used in the engine. This results in no pollution which is very desirable in the present-day situation. As there is no combustion taking place inside the cylinder there is only very little heat generation it is more economic and freer from air pollution. Magnet is one of the prime power sources used for many applications. By the demand of fossil fuels expecting that electro magnet is main

alternative fuel and it is very much useful for coming generation. Power to be produced at shaft of the engine is much more than the power to be consumed by electromagnet to repel permanent magnet. Thus, electromagnetic engine gives green energy, as no harmful by-product is emitted in Surrounding Atmosphere. Thus is the future of Automobile Industries.

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