



EXPERIMENTAL WORKING MODEL OF V8 SOLENOID ENGINE

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Abstract: - Electric Vehicles are becoming an increasingly attractive alternative to the car with a combustion engine, considering the effect on the environment as well as economic factors such as the gradual increasing price of fluid fossil fuels, maintenance and others. Due to that these vehicles are widely known for their zero-emission and powered by renewable energy sources. The idea of the project is to take another alternative design of EV prime mover to replace the existing electric motor. In general, EVs are driven and controlled by the integration of electrical, electronics and also mechanical components but the main component that moves these vehicles is the electric motor. The electric motor works on principles of electromagnetic induction by converting electrical energy to kinetic energy. This energy conversion is the main purpose of an electric motor and this actuator are highly popularized in most EV's designs. So a solenoid will be used to replace the electric motor as a prime mover. For this, a prototype of a solenoid is designed, built, and tested. The solenoid will be used as a kicking device. As earlier studies have investigated a solenoid as a shooting mechanism. In one study the solenoid is investigated as the most suitable kicking device. The other study designed and optimized a solenoid. In this study, a prototype solenoid is designed and tested.

Index Terms - Solenoid, Electromagnet, Electric vehicles, Engine

I. INTRODUCTION

A solenoid is a long piece of wire which is wound in the shape of a coil. When the electric current passes through the coil it creates a relatively uniform magnetic field inside the coil. The solenoid can create a magnetic field from electric current and this magnetic field can be used to generate a linear motion of a metal core. This simple device can be used as an electromagnet, as an inductor or as a miniature wireless receiving antenna in a circuit. solenoid engines are nothing but engines run on electrical energy instead of chemical energy. Like conventional engines, this system also has cylinder, piston (without piston rings), connecting rod, crankshaft. In this system, we used 2 Solenoids at Top dead Centre (TDC) & Bottom Dead Centre (BDC). Solenoid behaves like a magnet when electricity supplied to it. So we will induce these 2 solenoids for piston's reciprocation. The Important part is that the piston should be made of ferric material but other parts of this system have to made with non-ferrous.

II. LITERATURE SURVAY

1. Design and Fabrication of Solenoid Engine (2019)

Ram Bansal, Rahul Kushwah, Divya Pawar researched that With repeated handling, the windings of the electromagnet got loosened up which increases the gaps between the windings. This causes a drop in the potential energy from the power source and prevents the effective generation of magnetic flux. It is also noticed that the energy of the permanent magnet is higher than that of electromagnet. The design of the engine is to be done with materials having low density. This sector needs accurate manufacturing and utmost care. The MRPE has various advantages over an internal combustion engine. The most important advantage is that it is environmentally friendly.

2. Design and Development of V8 Solenoid Engine (2020)

Sarthak Raisonni have researched that an efficient working of an electric vehicle powered by a group of solenoids. A battery is used to supply current to the solenoid and also used to run the auxiliaries which are included in an automobile. The piston is designed using the solenoid concept and the power train follows the IC engine mechanism. This concept is proposed keeping in mind the gradually increasing prices of fossil fuels and pollution caused by them. It may require a high initial investment compared to the conventional gasoline engine cars but it will prove to be efficient and save a lot of money in the long run.

3. Design, Analysis and Manufacturing of a V8 - Solenoid Engine (2019)

Ruthwik Aki1, N. V. Dharma Teja2, K.S.V. Phanindra3, Setty Siddhartha introduced Based on our calculations we have obtained an efficiency of 21.44% and it can be increased by improving the design and selecting suitable materials which perform well in the given conditions, that is, making the mechanisms more fluid thereby reducing the friction and stresses induced. Even if this phenomenon is utilized for other purposes as done in an conventional Combustion Engine we are limited

to today's technological advancements to further up the efficiency, however this model shows great promise for the future where today's limitations are overcome by new innovations.

4. Study of 4 Stroke Solenoid Engine (2020)

Anamika Tiwari and Abhishek Tiwari have researched that a solenoid engine which drives the engine with the help of the solenoid actuator in place of combustion of fuel as such in internal combustion engine and electric motor in electric vehicle. Basically this engine works on the principle of electro-magnetism. With the help of electromagnetism principle we have decided to drive the engine and provide an alternative to electric motor in electric vehicle to compensate its various losses and avoid drainage of battery with a quick rate. It works like a normal fuel engine but now power source is battery with is totally pollution free and eco-friendly.

5. Design and Analysis of V6 Solenoid Engine (2019)

Bala Subramanyam researched that an Engine is the main power source of energy where Combustion, also known as burning, is the basic chemical process of releasing energy from a fuel and air mixture. The engine then converts the energy from the combustion to work. Various emissions from this process arises due to which environment is affected in a tremendous way, due to this reason now a day's electric vehicles came into existence. In this paper I succeeded in introducing an alternative way of reducing Air Pollution with an electromagnetic engine for generating power.

III. WORKING

The basic construction of a solenoid is where a long wire is helically wrapped around a hollow pipe repeatedly. This repeated helical wrapping of the wire causes an electromagnetic field to be produced inside of the pipe when electricity is passed through the wire. So, when current is passed through the wire it produces an electromagnetic flux, which attracts metal put inside the pipe towards it, and once the electrical supply is stopped then the electromagnetic flux is no longer present which drops the metal into its original position, and again when electrical supply is given then the metal rises again. This TO and FRO of the metal is used to produce mechanical energy of the engine, like the energy production of a conventional engine which is produced due to the TO and FRO motion of the pistons inside of the cylinder. An engine powering the device with magnetic components that aid in the operation of piston propelled engines by attaching the device individually to the pistons, causing the pistons to perform the up and down thrusts without the use of fuel thereby mobilizing the engine, eliminating the necessity of fuel and preventing pollution exhausting into the atmosphere.

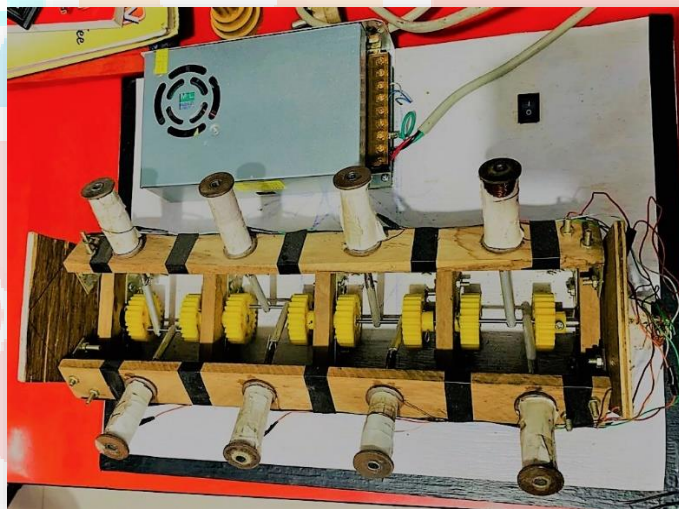


Fig. 1 Shows our working model of our project

IV. ADVANTAGES

1. No air pollution because no fuel is used.
2. Design is nearly close to conventional IC engine so that design complexity is avoided.
3. Replacement of engine is possible which is not in current EVs.
4. Operating cost is less compared to IC engines.
5. Non-renewable energy resources can be used to provide electricity so this can be whole futuristic.

V. DISADVANTAGES

1. Electrical efficacy is less in current stage due to lack of advance technologies.
2. Due to more moving part slightly vibrations are there.
3. Chances of shot circuit is there due to high input current.
4. Problem of Heat produced is there due to more windings.

VI. APPLICATIONS

1. It tends to be executed in Locomotives.
2. It can be also used in light duty reciprocating pump.

VII. FUTURE ENHANCEMENT

By slight modification in design and by the use of better hands the engine can be modified to generate more power, thereby increasing its efficiency, so that it can be used in commercial vehicles and other applications.

VIII. CONCLUSION

Based on our calculations, we have obtained an efficiency of 21.44% and it can be increased by improving the design and selecting suitable materials which perform well in the given conditions, that is, making the mechanisms more fluid thereby reducing the friction and stresses induced. With that being said the current solenoid coils are limited by the fact that there is a high drop in efficiency due to unwanted heat generated by the coils.

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