Designing of Magnetic Repulsion Piston Engine

1Nagawade Gouri, 2Nande Shridevi, 3Mhetre Pratap, 4Prof.Pooja Shinde

1BE Student, Department of Electrical Engineering, University of Pune, JSPM's BSIOTR, Wagholi, Pune, Maharashtra, India;

2BE Student ,Department of Electrical Engineering, University of Pune, JSPM's BSIOTR, Wagholi, Pune, Maharashtra, India;

3BE Student ,Department of Electrical Engineering, University of Pune, JSPM's BSIOTR, Wagholi, Pune, Maharashtra, India;

4.Asst.Professor,Department of Electrical Engineering, University of Pune, JSPM's BSIOTR, Wagholi, Pune Maharashtra, India.

Abstract :

Now a day, the demand is growing for the need of alternative fuels for transportation. Basically it indicates that electrical energy is being used almost everywhere to drive our life. But the current machines we use today are low in efficiency. Hence we require products with more power but also with higher efficiency Magnetism possesses a magnificent opening for development. Bullet trains using the technology of magnetic levitation have proved the strong nature of electromagnetic fields. Keeping in mind the arising needs of the industry, This paper describes the design and experiment of a system called Magnetic Repulsion Piston Engine, which makes use of magnetic force to drive a load. The working principle is based on attraction and repulsion between a permanent magnet and an electromagnet. The forces thus developed are used to generate mechanical power. Successful development in this field can actively help switch over IC Engines

Keywords - **Electromagnet Coil,Arduino 7.0, DC Motor .**

I. INTRODUCTION

The electromagnetic engine totally different from the IC engine because it works on new advancement in operating principles, Which replace the IC engine by using the electromagnetic effect. The engine is works on the principle of magnetic repulsion.
It consist the permanent magnet but instead of permanent magnet we are using the solenoid coil, because the cost of permanent magnet is too high. The solenoid and electromagnets technically are not be same thing. A solenoid is a type of electromagnet whose purpose is to generate a controlled magnetic field.

Normally, with the use of diesel or petrol the engine will start. Due to the movement of piston the crank shaft rotated and due to this the engine will start. But the more disadvantages of this systems, that it produces the pollution, friction losses are occurred due to piston, cost is more due to use of fuel etc. These disadvantages are overcome in Electromagnetic engine project. When supply is given to the solenoid coil it works. It acts like a attraction and repulsion. Due to this rotation of coil the crank shaft will rotate without any fuel. And finally, the engine will start. To control the speed microcontroller is used. And the relay is used for switching purpose. As it is fuel less engine it will not produce pollution, friction losses are avoided and also cost is reduced as there is no fuel requirement.
Drawbacks of the Present IC Engine:
1. The pollution due to IC engine is more.
2. The friction losses occur due to IC engine.
3. The cost of IC engine is more as it require fuel for its operation.
4. The present system is not economical and environment friendly.

2. BLOCK DIAGRAM AND WORKING OF MAGNETIC ENGINE:

The working of the proposed engine can be well studied by going through the following block diagram. As shown in the block diagram the main components required are battery (power source), high rating current controller, arduino, volt guard and the electromagnetic engine with proper windings. The figure shows the block diagram of electromagnetic engine. It consists of switch, arduino cicuit, relay, power supply, solenoid coil.
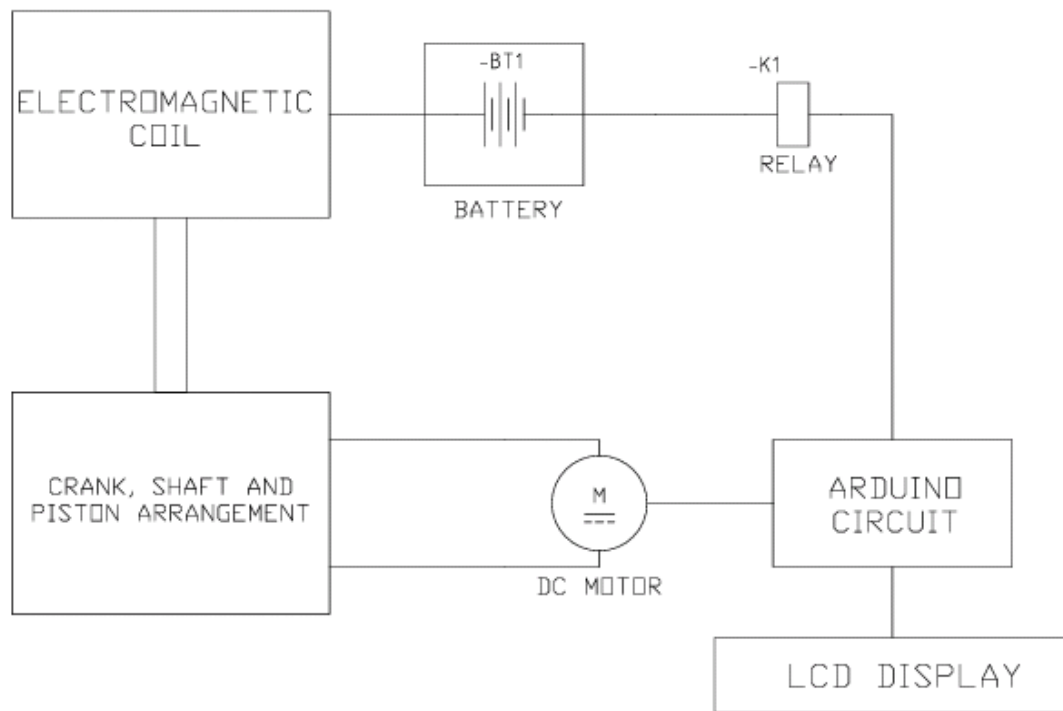
Figure No. 2.1   Basic block diagram of electromagnetic engine

When we pressed the start button then arduino starts executing the programs. According, this through the relay supply is provided to solenoid coil. Due to solenoid coil principle, the working of different block is explained below. When the supply is given to the solenoid coil, due to its magnetism it will attract connecting rod at the same time the crankshaft complete its rotation of half cycle. When the supply is cut off then solenoid coil repel the connecting rod and crankshaft completed its one rotation. And wheel of the vehicle is connecting to the shaft so finally, the engine starts. This process is repeated for further cycles.

COMPONENTS:

1 SOLENOID COIL

The solenoid and electromagnets technically are not be same thing. But people talk as if they are a solenoid is just a coil of wire, but when you run a current through it, you create an electromagnet. A solenoid is a type of electromagnet whose purpose is to generate a controlled magnetic field. If the purpose of solenoid is instead to impede changes in the electric current, a solenoid can be more specifically classified as an inductor rather than an electromagnet. The diameter of the solenoid coil is 3cm, length of the coil is 9cm and 270 turns coils are wound. In our project the solenoid coil acts as a push pull coil. The function is to attract and repel the rod.

2. REGULATOR

The function of a linear voltage regulator is to convert a varying DC voltage to a constant often specific, lower DC voltage. In addition, they often provide a current limiting function to protect the power supply and a load from over current. A constant output voltage is required in many power applications, but the voltage provided by many energy sources will vary with changes in load impedance.
Furthermore, when an unregulated DC power supply is the energy source, its output voltage is also varies with change in input voltage. To circumvent this, some power supplies use a liner regulator voltage to maintain the output voltage at a steady value.
In our project, it is used to regulate 9v to 5v DC supply. It has three pins, i.e. input, output and ground.

3. RECTIFIER

Some DC power supplies use a AC mains electricity as an energy source. Such power supplies lead sometimes employ a transformer to convert the input voltage to higher or lower AC voltage. A rectifier is used to convert the transformer output voltage to a varying DC voltage, which in turn is passed through an electronic filter to convert it to an unregulated DC voltage. The filter used most, but not all of the main AC voltage variations , the remaining voltage are known as ripple. The electric loads tolerance of ripple dictates the minimum amount of filtering that must be provided by a power supply. In some application, high ripple is tolerated and therefore no filtering is required. For example: In some battery charging applications it is possible to implement a mains powered DC power supply with nothing more than a transformer and a single rectifier diode, with a resistor in series with output to limit charging current.

4.LCD

LCD indicates different mode settings & set point adjustment. Also 16 char are divided to indicate speed output. The LCD Display used here is 16 characters by 2 line display. The 16 characters in both lines are equally divided to indicate

commands and speed. In sub routines 'Enter Speed' and 'Current Speed' message, set Speed value is indicated on screen. A liquid-crystal display (LCD) is a flat-panel display or other electronic visual display that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly.

5. ARDUINO

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or breadboards (shields) and other circuits The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

6.DC MOTOR

A DC motor is an electrical machine which **converts electrical energy into mechanical energy.** The working of DC motor is based on the principle that when a current carrying conductor is placed in a magnetic field, it experiences a mechanical force. The direction of the mechanical force is given by **Fleming's Left-hand Rule** and its magnitude is given by **F = BIL** Newton.The working of the AC motor (Induction motor and Synchronous Motor) is different from the DC motor. There is no basic difference in the construction of a DC generator and a DC motor. A coil of wire with a current running through it generates an electromagnetic field aligned with the center of the coil. The direction and magnitude of the magnetic field produced by the coil can be changed with the direction and magnitude of the current flowing through it.

4.Experimental Setup :
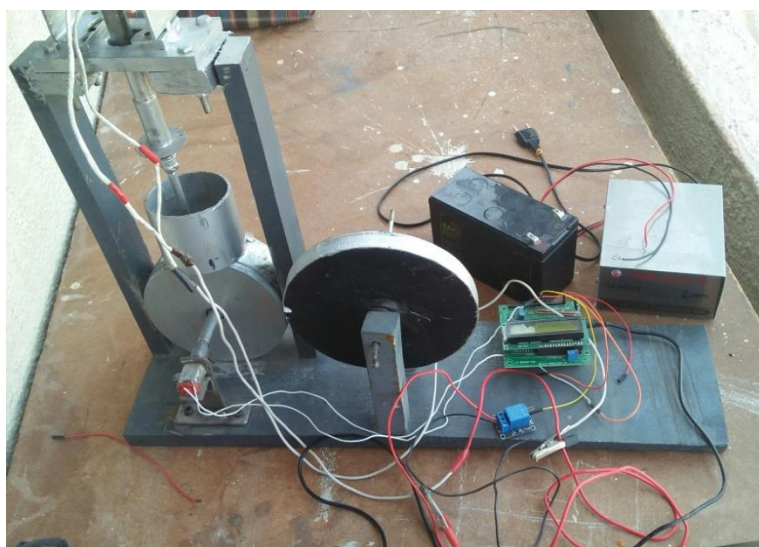
5. RESULTS

With the principle of magnetic repulsion, the design of piston engine is completed. In this project the arrangement is made to generate the voltage from designed piston engine .A DC motor of 12V is attached to the shaft of piston engine .This engine generate a voltage approximately of 0.01V which is sufficient to glow a LED.

The main aim of this project is that the engine should run without a fuel. It works on the principle of attraction and repulsion. Without a fuel consumption but working on attraction repulsion, principle, these engines run with a speed of approximately 10 to 15RPM. This engine results in efficient working with fuel saving.

6. CONCLUSION

The project proposes an idea of electromagnetic engine which uses the property of an electromagnet by virtue of which it changes the polarity of its poles whenever the direction of current entering the windings is changed. The proposed engine has been made in comparison with a 70 cc conventional internal combustion engine.

The proposed electromagnetic engine uses electric power to run which is cleaner and cheaper than fossil fuels. In an internal combustion engine the problem of heating is there but for the proposed engine there is no such problem. The proposed engine is a comparison with a 70cc internal combustion engine. It is visible from the above calculations that the force is produced twice in the proposed engine that is repulsion force at TDC and attraction force at BDC but in conventional engine pressure is applied at piston head only when it reaches the TDC, thus proposed engine is more powerful than the conventional engine.

As the proposed engine works on a direct current supply from a battery, it can be easily coupled with photovoltaic cells in order to charge the batteries.Such type of engine will be employed in future.

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