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PNEUMATIC & ELECTROMAGNATIC HYBRID ENGINE

Prof. Ashish Devshette[1], Abhishek Gat[2], Rohan Tadkalkar[3], Vasistha Lohiya[4], Omkar Jadhav[5]

[1]Professor, Dept. of Mechanical Engineering, JSPMs Rajarshi Shahu College of Engineering, Pune, Maharashtra.
[2,3,4,5]Student, Dept. of Mechanical Engineering, JSPMs Rajarshi Shahu College of Engineering, Pune, Maharashtra, India.

Abstract - *In the recent science and technology there is an increase in use of fossil fuels. Recently scientists are searching for an alternative fuel. This project is an answer to replace fossil fuel and reduce pollution by providing main power sources for the automobile engines. This project is to describe the construction and design of a magnetic piston engine, which operate with the help of electromagnetic force. This mechanism is completely different from a normal IC engine mechanism. It works with the principle electromagnetic effect and attraction of magnetic force instead of using fossil fuels. It consists of, two permanent magnet and two electromagnets. Electromagnets are mounted on the cylinder head and the permanent magnets are mounted on the piston head. Here, the use of spark plug and valves are eliminated. Electromagnet contains copper windings. These electromagnets are work on the basis of current supplied to them. The current is supplied from a battery with a required voltage. The piston contains permanent magnet which moves from TDC to BDC and vice versa which will result in converting reciprocating into rotary motion.*

1. INTRODUCTION

Today there is need of alternate fuel for day today life. Fuel prices are increasing rapidly and environment get polluted from the emission of hazardous gases from fuel sources. Shortage of the fuel is expected from consumption. Hence there is need to reduce the emission of gases like CO, SO2, NOx, which are hazardous to nature.

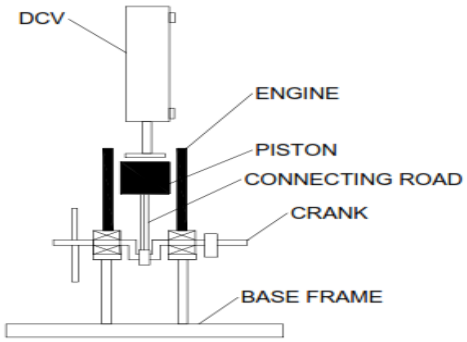
With reduced fossil fuel resources and increase in energy costs and environmental concerns, engines use alternate energy sources such as bio-fuel, solar power; wind power, electric power, stored power, etc. are being developed around the world. However, such engines have many disadvantages. Production of bio-fuel takes vast resources and they still pollute the environment. Similarly, the solar power is not efficient. Added to all, the initial capital and subsequent maintenance costs for machines that use alternative energy sources are very high. Hence, in the absence of a viable alternative, as of now, switching to new technology by changing from traditional Internal Combustion engines has been a great challenge. Magnetism is the basic principle of working for an electromagnetic engine. The general property of magnet i.e. repulsion and attraction forces is converted into mechanical work. A magnet has two poles, a north pole and a south pole. When two like poles are brought together they repel each other and when unlike poles are brought together they attract. This principle is being used in the electromagnetic engine

1.1 Problem Statement

Now days, increasing fuel prices and pollution are the major demerits of Internal Combustion engines.That are compensated by the Electromagnetic & compressed air engine. Because of the use of batteries in series thus more input is given to the system to get increased output as a result. In all the research papers a flywheel of 2 or 3 kg is used , whereas here the load is increased to 5 kg.

1.2 Proposed Solution

To overcome the above drawbacks the pneumatic and electromagnetic engine is proposed with the help of the hybrid engine energy can be generated without the use of fuel combustion thus it reduces the air pollution



2. Design

This working of the **electromagnetic engine** is based on attraction & repulsive force of the magnet and by **compressed air method** in which it work as **pneumatic engine** in which Single stroke compressed air engine is divided into two part primary and secondary part.

Primary part :- During primary stroke primary inlet and outlet is open so that compressed air can get inside through inlet and expand, due to which piston moves and produce mechanical work and in the meanwhile outlet allow air in opposite side to move out of cylinder (exhaust).

Secondary Part:- After complementation of Primary stroke secondary stroke gets activated, during this stroke secondary inlet and outlet is open so that compressed air can get inside through inlet and expand, due to which piston moves in opposite direction and produce mechanical work and in the meanwhile secondary outlet allow air to move out of cylinder (exhaust).

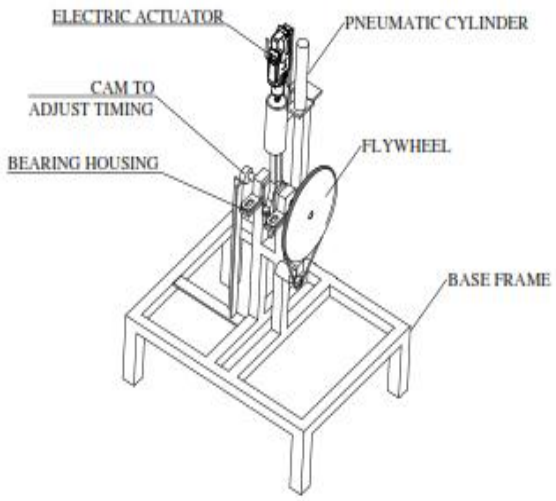


Table -1: Dimensions of Components

Components	Dimensions	Material
Cylinder	Inner diameter = 0.038m. Outer diameter = 0.070m	**Aluminium**
Connecting Rod	Big end diameter = 0.012 m. Small end diameter= 0.010m. Length= 0.06492m.	**Cast Iron**
Piston	Diameter = 0.037m. Height = 0.020m	**Aluminium**
Fly Wheel	Diameter of outer circle = 0.17m. Hole at centre = 0.03m	**Mild Steel**
Electromagnet	Diameter = 0.065m. Height = 0.080m	-

1)Cylinder:- Electromagnetic engine uses only magnets for its operation. The cylinder prevents unwanted magnetic field and other losses.

2)Piston:- The crankshaft and the piston rod convert the linear reciprocating movement of the piston to the circular movement.

3) Connecting Rod:- In a reciprocating engine, the connecting rod is used to connect the piston to the crankshaft.

4) Flywheel:- Flywheel is made up of mild steel and it is used to convert reciprocating energy into rotational energy.

5) Electromagnet:- An electromagnetic coil is formed when an insulated solid copper wire is wound around a core or form to create an inductor or electromagnet

6) Pneumatic Cylinder:-Pneumatic cylinder are mechanical devices which use the power of compressed gas to produce a force in a reciprocating linear motion

A graph given below was drawn for comparing Actual power with respect to theoretical power and the Speed of rotation in rpm:

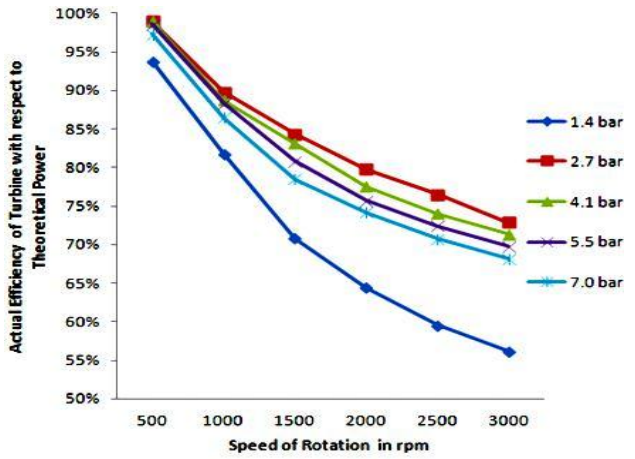


Chart -1: Actual power with respect to theoretical power and the Speed of rotation in rpm

Fig -1:Pneumatic Cylinder

Pneumatic cylinder(s) (sometimes known as **air cylinders**) are mechanical devices which use the power of compressed gas to produce a force in a reciprocating linear motion.

Like hydraulic cylinders, something forces a piston to move in the desired direction. The piston is a disc or cylinder, and the piston rod transfers the force it develops to the object to be moved. Engineers sometimes prefer to use pneumatics because they are quieter, cleaner, and do not require large amounts of space for fluid storage.

3. CONCLUSIONS

This project helped us a lot in understanding the applications of thermotical knowledge, including the manufacturing processes involved during the project.

This helps in the reducing Weight of the engine to great extent also Exhaust Air causes no harm to environment as it is cold and clean.

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