DESIGN AND FABRICATION OF AIR ENGINE FOR TWO WHEELERS

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Abstract—*This project work deals with the Compressed-air engine is a pneumatic actuator that creates useful work by expanding compressed air. They have existed in many forms over the past two centuries, ranging in size from hand held turbines up to several hundred horsepower. Some types rely on pistons and cylinders, others use turbines. Many compressed air engines improve their performance by heating the incoming air, or the engine itself. Some took this a stage further and burned fuel in the cylinder or turbine, forming a type of internal combustion engine.There is currently some interest in developing air cars. Several engines have been proposed for these, although none have demonstrated the performance and long life needed for personal transport.*

Keywords— air compressor, engine, power generation and compressed air.

1. INTRODUCTION

A compressed-air vehicle is powered by an air engine, using compressed air, which is stored in a tank. Instead of mixing fuel with air and burning it in the engine to drive pistons with hot expanding gases, compressed air vehicles (CAV) use the expansion of compressed air to drive their pistons. One manufacturer claims to have designed an engine that is 90 percent efficient.

Compressed air propulsion may also be incorporated in hybrid systems, e.g., battery electric propulsion and fuel tanks to recharge the batteries. This kind of system is called hybrid-pneumatic electric propulsion. Additionally, regenerative braking can also be used in conjunction with this system.

PROCESS INVOLVED

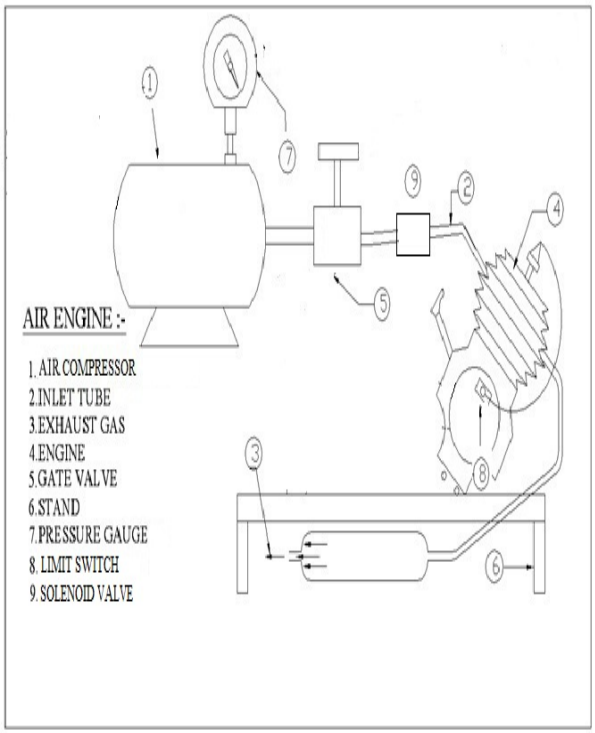
The main processesinvolved are

1.Intake stroke
2.compression stroke
3.power stroke
4.exhauststrok

In our project we have to modified these four strokes into totally two stoke with the help of inner CAM alteration. In air engine we can design a new CAM which is operate only Inlet stroke and exhaust stroke. Actually in four stroke engine the inlet and exhaust valve opens only one time to complete the total full cycle. In that time the piston moving from top dead center to bottom dead center for two times. A stroke refers to the full travel of the piston from Top Dead Center (TDC) to Bottom Dead Center (BDC).

In our air engine project, we have to open inlet and exhaust valve in each and every stroke of the engine so that it will convert the four stroke engine to two stroke engine by modifying the CAM shaft of the engine.

2. DIAGRAM



COMPONENTS USED:

- IC ENGINE – 4 STROKE
- AIR COMPRESSOR
- GATE VALVE
- MILD STEEL SQUARE PIPE FOR STAND
- SILENCER
- POLYURETHANE TUBE
- SOLENOID VALVE
- CHAIN DRIVE
- SPROCKET

- WHEEL

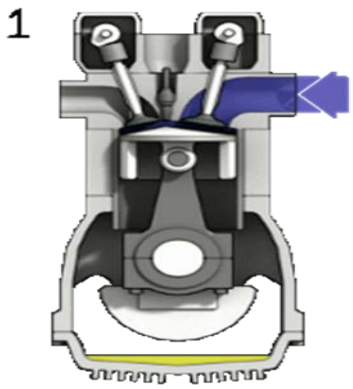
3. **COMPONENTS DESCRIPTION**:

IC ENGINE:

An internal combustion engine (ICE) is an engine where the combustion of a fuel occurs with an oxidizer (usually air) in a combustion chamber that is an integral part of the working fluid flow circuit. In an internal combustion engine the expansion of the high-temperature and high-pressure gases produced by combustion apply direct force to some component of the engine. The force is applied typically to pistons, turbine blades, or a nozzle. This force moves the component over a distance, transforming chemical energy into useful mechanical energy. The first commercially successful internal combustion engine was created by Étienne Lenoiraround 1859. And the first modern internal combustion engine was created in 1864 by Siegfried Marcus.The term internal combustion engine usually refers to an engine in which combustion is intermittent, such as the more familiar four-stroke and two-stroke piston engines, along with variants, such as the six-stroke piston engine and the Wankel rotary engine. A second class of internal combustion engines use continuous combustion: gas turbines, jet engines and most rocket engines, each of which are internal combustion engines on the same principle as previously described. Firearms are also a form of internal combustion engine. Internal combustion engines are quite different from external combustion engines, such as steam or Stirling engines, in which the energy is delivered to a working fluid not consisting of, mixed with, or contaminated by combustion products. Working fluids can be air, hot water, pressurized water or even liquid sodium, heated in a boiler. ICEs are usually powered by energy-dense fuels such as gasoline or diesel, liquids derived from fossil fuels. While there are many stationary applications, most ICEs are used in mobile applications and are the dominant power supply for cars, aircraft, and boats.

AIR COMPRESSOR:

An air compressor is a device that converts power (usually from an electric motor, a diesel engine or a gasoline engine) into kinetic energy by compressing and pressurizing air, which, on command, can be released in quick bursts. There are numerous methods of air compression, divided into either positive-displacement or negative-displacement types.



4-stroke engines

Diagram shows the operation of a 4 stroke SI engine.
Labels:

1 - Induction
2 - Compression
3 - Power
4 - Exhaust

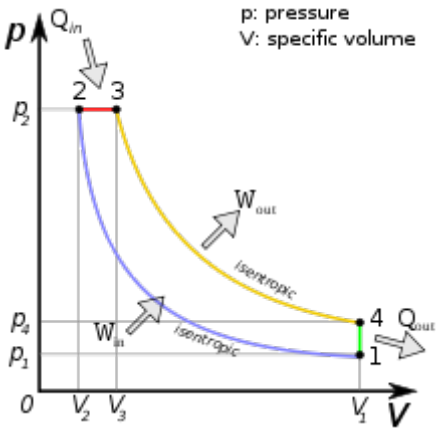
The top dead center (TDC) of a piston is the position where it is nearest to the valves; bottom dead center (BDC) is the opposite position where it is furtherest from them. A stroke is the movement of a piston from TDC to BDC or vice versa together with the associated process. While an engine is in operation the crankshaft rotates continuously at a nearly constant speed. In a 4-stroke ICE each piston experiments 2 strokes per crankshaft revolution in the following order. Starting the description at TDC, these are:

Intake, induction or suction: The intake valves are open as a result of the cam lobe pressing down on the valve stem. The piston moves downward increasing the volume of the combustion chamber and allowing air to enter in the case of a CI engine or an air fuel mix in the case of SI engines that do not use direct injection. The air or air-fuel mixture is called the charge in any case.

1.Compression: In this stroke, both valves are closed and the piston moves upward reducing the combustion chamber volume which reaches its minimum when the piston is at TDC. The piston performs work on the charge as it is being compressed; as a result its pressure, temperature and density increase; an approximation to this behavior is provided by the ideal gas law. Just before the piston reaches TDC, ignition begins.

2.Power or working stroke: The pressure of the combustion gases pushes the piston downward exerting more workthan it was made to compress the charge. Complementary to the compression stroke, the combustion gases expand and as a result their temperature, pressure and density decreases. When the piston is near to BDC the exhaust valve opens. The combustion gases expand irreversibly due to the leftover pressure—in excess of back pressure, the gauge pressure on the exhaust port—, this is called the blowdown.

DIESEL CYCLE



1) *ENGINE SPECIFICATION*
2) *Type of fuel used : Petrol*
3) *Cooling system : Air cooled*
4) *Number of cylinder : Single*
5) *Number of stroke : Four Stroke*
6) *Arrangement : Vertical*
7) *Cubic capacity : 100*

4. RESULT AND CONCLUSION:

This is a revolutionary engine design which is eco friendly, pollution free, but also very economical. This redresses both the problems of fuel crises and pollution. However excessive research is needed to completely prove the technology for both its commercial and technical viability.

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