

Pneumatic Powered Air Engine

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ABSTRACT—In present scenario CNC turning operation plays a vital role in metal-based manufacturing industries. Therefore, selection of optimum Compressed-air engine as a pneumatic actuator that converts one form of energy into another. The Air Driven Engine Isan eco-friendly engine which operates with compressed air. This Engine uses the expansion of compressed air to drive the pistons of the engine. An Air Driven Engine is a pneumatic actuator that creates useful work by expanding compressed air.

There is no mixing of fuel with air as there is no combustion. An Air Driven Engine makes use of Compressed Air Technology for its operation The Compressed Air Technology is quite simple. If we compress normal air into a cylinder the air would hold some energy within it. This energy can be utilized for useful purposes. When this compressed air expands, the energy is released to do work. So, this energy in compressed air can also be utilized to displace a piston.

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.

Index Terms— Compressor, Pneumatic Cylinder, Wheel,Pipes& Valves, Connecting Rod, Supporting Frame, Joints & Fixtures(key words)

I. INTRODUCTION

In Automobile vehicles internal combustion engine is widely use and for last few years the automobile vehicles are increases day by day in market so that also increase the demand of fossil fuels. For using this fossil fuel in automobile also increases the problem of pollution in

environment. The main pollutant is produced by I.C. Engine is hydrocarbon (HC) and carbon monoxide (CO). I.C Engine is also producing less amount of nitrogen oxide (NOx) and lead. In last ten years the automobile vehicle population is increased and also pollution is increased which create a major problem in atmosphere like global warming, greenhouse effect etc. and also fossil fuel is not a renewable source. For this energy crisis many researchers are developing a new source which is renewable as well as non-polluting.

In last few years the many companies and researcher is work on zero pollutant engine. This engine is an also I.C. Engine but this engine has not required any type of fuel like Petrol, Diesel, LPG, and CNG it is work on compressed air power. In this engine the main source is compressed air which is totally pollution free. This type of engine is not producing any type of pollution like CO, HC, and NOx this is totally eco-friendly engine.

For last ten years many researchers has been work on compressed air engine. In this review study on last ten years papers and found out the conclusion on experimental study on the engine which is run on compressed air as alternate of fuel. The present situation of depletion in fossil fuel and high rise in price of gasoline has forced researchers to find other sources of energy to replace fossil fuel. Some presented the idea of electric motor, hybrid engine and newly developed Compressed Air Engine (CAE)

Total assembly of pneumatic air engine



Fig Pneumatic power air engine

WHEEL



PIPE



CONNECTING ROD



VALVE



SUPPORTING FRAME: -



WORKING PRINCIPLE

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 use the expansion of compressed air to drive their pistons.

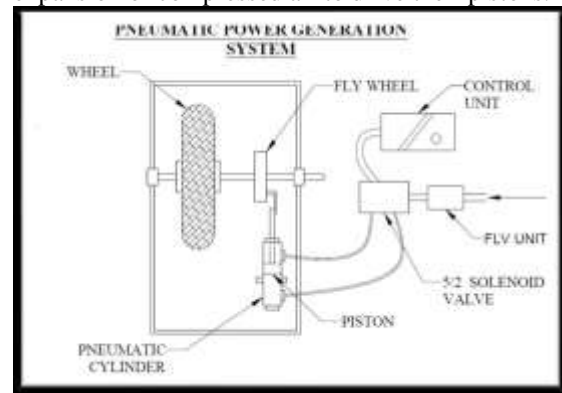


Fig. Pneumatic Power Generation System

The complete cycle of a two-stroke air engine is as When the piston is at the top position

its spindle opens the ball valve, the compressed air fills the space of cylinder. The air exerts pressure on surface of the piston, causing its movement down and rotate the crankshaft. The valve closes when piston is moving down, but the air is still expanding and exerts a force on the piston.

In the lower turning point piston is opening outlet window and releasing air outside. Exhaust temperature of it will be slightly less than atmospheric temperature (i.e., 20-25°C) and thus helps in controlling global warming and reducing temperature rise caused due to other means.

The shaft is starting to move by inertia then pushes the piston to the top and closing the off window. In the cylinder are small amounts of air, so the piston moves upwards until it will again open the ball valve and the cycle repeats.

ADVANTAGES

1. Idle time of the machine is reduced.
2. It reduces the manual labor
3. Hence, production rate is higher
4. In this mechanism there is no backlash
5. Less pollution
6. No burning fuel is needed

DISADVANTAGES

1. Initial higher cost.
2. May be a choice of air leakage
3. Cylinder stroke length is constant

II. APPLICATIONS

The compressed air engine can be used in many vehicles. Some of its applications to be used as engine for vehicles are:

a) Mopeds

Jem Stansfield, an English inventor has been able to convert a regular scooter to a compressed air moped. This has been done by equipping the scooter with a compressed air engine and air tank.

b) Buses

MDI makes Multicasts vehicle that can be used as buses or trucks. Rapses also already expressed an interest in the compressed-air pollution-free bus.

c) Locomotives

Compressed air locomotives have been historically used as mining locomotives and in various areas.

d) Trams

Various compressed-air-powered trams were trailed, starting in 1876 and has been successfully implemented in some cases.

e) Watercraft and aircraft

Currently, no water or air vehicles exist that make use of the air engine. Historically compressed air engines propelled certain torpedoes.

III. CONCLUSION

This project is providing the review on compressed air engine its design experimental analysis as well as new technology and development over the last 10 years. In this paper some new technology is develop like new design of cam for four stroke engines, also provide new technology of fabrication of compressed air vehicle. This review is showing some advantages and disadvantages of compressed air vehicle and the experimental analysis like load calculation, power production by engine and main factor is pollution is not produced by this engine. The main key factor is obtained which is shown in below:

1. The thermodynamics of heat exchange, mechanical and aerodynamic losses, electrical efficiencies etc.
2. all these effects may reduce the overall efficiency to 40% or less.
3. The speed of the engine is found to increase almost linearly with the increase in the pressures.
4. High pressure of 9 bars the maximum speed attained was 6.5 kmh-1 travelling 1.7 km.
5. The engine is modified from a 4-working stroke to a 2- working stroke engine (power and exhaust) by modification of cam-gear system.
6. At 20°C, 22 litter tank loaded with air at 8 bars used just 15.6 W of vitality.
7. The motorcycle installed with the compressed air engine can operate at maximum speed around 38.2
8. km/hr. and distance up to 5 km.
9. This will produce enough power for speeds of about 15-20 kilometers per hour.
10. Compressed air engine is not producing any harmful gases for environment as well as human body this is totally pollution free engine.

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