

Micro Air Consumption Engine Vehicle With Novel Energy Multiplier Flywheel

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Abstract- *The Air Driven Engine is an eco-friendly engine which operates with compressed air. 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, conventionally rotary air engine are used but they require high operating pressure and high air consumption hence they find limited applications. The aim of project is to develop a micro air consumption engine with low air consumption up to 3 cc per stroke & will operate such that when this compressed air expands, the energy is released to do work. So this energy in compressed air is utilized to displace a piston which operates a linear to rotary actuator which further drives the energy multiplier flywheel. Thus together by combination of the micro air consumption engine and novel flywheel we can get the maximum possible mileage from the compressed air. The project work will include design, development and analysis of the air engine, rotary linear actuator, modified energy multiplier flywheel and the vehicle to demonstrate the working of the combined system.*

Keywords- Flywheel, Actuator, Rack and Pinion, Electronic Relay.

I. INTRODUCTION

We have been raised with the idea that it is necessary to burn a fuel to produce power which we can use. We are sold coal, coke, timber, paraffin/kerosene, petrol/gasoline, diesel, propane, etc. for us to burn in order to “get” energy. While it is perfectly true that burning these things will indeed result in energy in a form which we find convenient to use in heating, cooling, powering engines, etc. what is carefully avoided is the fact that it is not at all necessary to burn a fuel in order to run the things which we want to power. This ‘inconvenient’ fact has been concealed and denied for more than fifty years now (very surprisingly, by the people who want to sell us these fuels to burn – do you perhaps think that they may have some motive for this, other than our best interests which they no doubt are very concerned about. This chapter is about ‘fuel-less’ motors. Strictly speaking, they are

not ‘self-powered’ but as they don’t burn a fuel of any kind, in everyday language they can be described as ‘self-powered’.

II. LITERATURE REVIEW

1. Ulf Schaper, Oliver Sawodny, Tobias Mahl and Uti Blessing: They explain the DMF along with its application and components. Afterwards a detailed model of the DMF dynamics is presented. This mainly includes a model for the two arc springs in the DMF and their friction behavior. Both centrifugal effects and redirection forces act radially on the arc spring which induces friction. The numerical method is used to measure model validation.

2. Bjorn Bolund, Hans Bernhoff, Mats Leijon: This paper explains the use of flywheel. Nowadays flywheels are complex construction where energy is stored mechanically and transferred to and from the flywheel by an integrated motor or generator. The wheel has been replaced by a steel or composite rotor and magnetic bearings have been introduced. By increasing the voltage, current losses are decreased and otherwise necessary transformer steps become redundant.

3. Jordan Firth, Jonathan Black: This paper explains the vibration interaction in a multiple flywheel system. Flywheels can be used for kinetic energy storage. In this paper one unstudied problem with vibration interaction between multiple unbalanced wheel. This paper uses a linear state space dynamics model to study the impact of vibration interaction. Specifically, imbalanced induced vibration inputs in one flywheel rotor are used to cause a resonant whirling vibration in another rotor. Vibration is most severe when both rotors are spinning in the same direction.

III. SYSTEM DESCRIPTION

System Parts :

1. Actuator or cylinder
2. Flywheel
3. Rack and pinion
4. Valves
5. Bearing

6. Proximity sensor
7. FCV
8. Relay

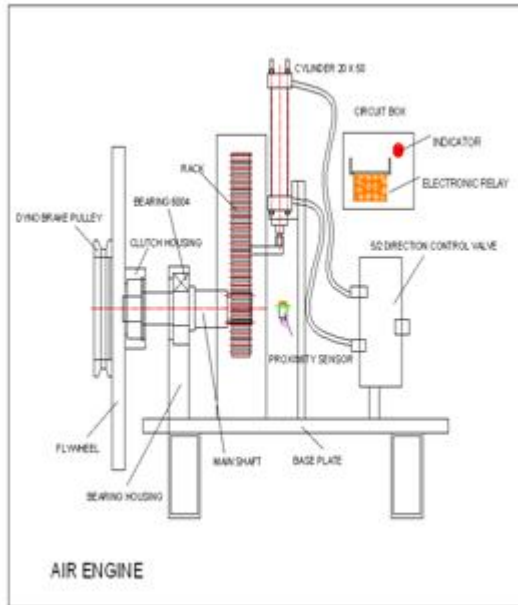


Fig .Block Diagram

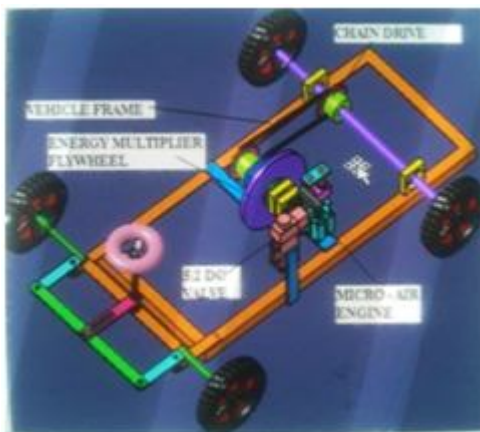


Fig .3D image project setup

IV. WORKING

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, conventionally rotary air engine are used but they require high operating pressure and high air consumption hence they find limited applications. The aim of project is to develop a micro air consumption engine with low air consumption up to 3 cc per stroke & will operate such that when this compressed air expands, the energy is released to do work. So this energy in compressed air is utilized to displace a piston which operates a

linear to rotary actuator which further drives the energy multiplier flywheel. Thus together by combination of the micro air consumption engine and novel flywheel we can get the maximum possible mileage from the compressed air.

V. CONCLUSION

- We were able to successfully complete the design and fabrication of the Air Driven Engine.
- By doing this project we gained the knowledge about pneumatic system and how automation can be effectively done with the help of pneumatic system.
- We were also able to gain knowledge about the basics of the normal double acting cylinders. The Air Driven Engine provides an effective method for power production and transmission.
- Even though its applications are limited currently, further research could provide wider applications.

VI. FUTURE SCOPE

- Design and fabrication of a new engine made of light metal will give better results.
- Usage of compressed air tanks for storage and supply will give it more scope in automobiles.
- Much like electrical vehicles, air powered vehicles would ultimately be powered through the electrical grid. This makes it easier to focus on reducing pollution from one source, as opposed to the millions of vehicles on the road.
- Transportation of the fuel would not be required due to drawing power off the electrical grid. This presents significant cost benefits. Pollution created during fuel transportation would be eliminated.

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