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COMPRESSED AIR PRODUCTION AND ITS UTILISATION FOR MOVING VEHICLES

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Abstract - *This project is design, fabrication and development of pneumatic vehicle witch is rear wheel drive. The complete body looks like a vehicle in which manual operation followed. This product is a pneumatic vehicle useful for industrial, handicapped people and purpose. The power transmission takes place from rear wheel through chin drive. The entire arrangement of power transmission by means of connecting rod of the actuator is taken along with the chain sprocket. When the cylinder is connected to air tank, it would give driving force due to the pressure at which air sent. Two person can seat on this vehicle at a time. The material mild steel is choose as a main structure fastening by joint and main components of this vehicle is air tank, solenoid valve, electrical control unit, pneumatic cylinder, chain, sprocket wheel then all component we fabricated together. At the end when the project will be ready the vehicle will be tested by several people and their comment will be recorded and would be undertaken. The concept of compressed air vehicle is a practice to reduce the air pollution to large extend as its exhaust is nothing but air.*

***Key Words*: Compressed Air, Chassis, Pneumatic Cylinder, Solar Panel, Air Tank**

1.INTRODUCTION

The compressed air powered vehicle works on the principle of the compressed air technology. Compressed air in a cylinder would hold some energy within it. This energy can be utilized for useful purpose. When this compressed air expands, the energy is released to do work. Compared to batteries, compressed air is favorable because of high energy, density, low toxicity, fast filling at low cost and long service life. This issues make it technically challenging to design air engines for all kind of compressed air driven vehicles. To meet the growing demand of public transportation, sustainable with environmental consciousness, people are in search for the ultimate clean car with zero emissions. Many concept vehicles work proposed that run on everything from solar power to algae, but most of them are expensive are hard to find fuels. The first compressed vehicle was established in France by a polish engineer Louis Mekarski in 1870. It was patented in 1872 and 1873 and was tested in Paris in 1876. The working principle of Mekarski's engine was the use of energy stored in compressed air, another application of the compressed air to drive vehicles comes from Uruguay in 1984, where Armando Regusci has been involved in constructing this machines. He constructed a four wheeler with pneumatic engine which travelled 100 km on a single tank. A compressed air vehicle project in the form of light utility vehicle (LUV) has been a topic of great interest for the last decade and many theoretical and experimental investigations have appeared on the subject in the literature. Many largest car manufacturers all over the world have taken up the lead in this direction base on the initial technological concept of the pioneer. Including the French company Motor Development International (MDI). IN 1992 an air car was developed by Luxembourg based MDI group founder and former formula one engineer Guy Negre and this car work on compressed air.

2. PROBLEM STATEMENT

The much more increase in use of vehicles has let to growth in pollution and so to reduce environmental pollution and also the growth in use of non-renewable fuels like diesel and petrol fuel has let to the chance of it's extinction from earth. Which are also very costly and more polluting so to reduce all this factor compressed vehicle is going to run so there is also need to be change of mechanism and also to avoid environmental problems renewable energy has been applied to automobile. A compressed air engine of a renewable energy vehicle is introduced. To implement the given changes there are lots of complications to be faced and most complicated is the structure of the vehicle so to make simple structure of vehicle and dynamically balanced system. As the weight of vehicle is a big issue so there is a need for reduction of weight of vehicle to avoid the bulky system and vibrations in the vehicle

3. OBJECTIVES

The main objective is to develop compressed air engine which can be run by compressed Air. Main advantage of compressed air vehicle is that no hydrocarbon fuel means no combustion process

1. To save the non- renewable sources of energy
2. To reduce the vehicle weight by changing components
3. To reduce the pollution by controlling emission
4. To deny the combustion as there is no fuel mixing with air

4. COMPONENTS TO BE USED

1. Air Tank
2. Pneumatic Cylinder
3. Wheels
4. Chassis
5. Pressure Gauge
6. Ball Bearing
7. Spur Gear
8. Sprocket Chain
9. Crank Shaft
10. Piston
11. Solar Panel
12. Batteries

5. WORKING MECHANISM

In this compressed air vehicle we use solar panel for compressed air production. This solar panel generates electric power which is attached to battery which can store electric power and this electric power further is utilized to run the compressor to produce compressed air.

Working of solar panel- Photovoltaic modules use light energy from the sun to generate electricity through the photovoltaic effect. The majority of modules use wafer based crystalline silicon cells or thin-film cells. The structural member of a module can either be the top layer or the back layer. Cells must also be protected from mechanical damage and moisture.
Compressed air vehicle working mechanism- It consist of the air storage tank which stores the compressed air inside the tank. Then there is a gate valve for the controlling of the compressed air into the next part of the system. This vehicle also consist of a non-return valve, pneumatic cylinder, shaft and chain drive and sprocket mechanism. The compressed air stored in the air tank the gate valve which is placed near the handle for the comfort of the driver, when the gate valve is opened the air enters the pneumatic cylinder for the actuation or the motion of vehicle. This vehicle is designed as a four-wheeler for the better comfort and easier handling of the vehicle. The compressed air enters the pneumatic cylinder through a gate valve by which the shaft is driven and by the chain sprocket mechanism the power from a shaft is transmitted to rear wheel shaft thus making the vehicle driven.

6. ADVANTAGES

- Air is non-flammable and most important non polluting
- Compressed air vehicle reduce cost of vehicle production
- High torque for minimum volume
- Design of engine is simple and robust
- Low manufacture and maintenance cost
- Air tanks can be recycled with less pollution

7. FUTURE SCOPE

- As there is no use of fossil fuels so there is no emission of harmful gases which leads to reduction in environmental pollution and harmful effects of the pollutants
- The traveling by vehicle becomes economically cheap and easy as air is available everywhere and that to unlimited and easily
- The weight of the vehicle is an important issue as to avoid bulky system which will the reduce overall cost of vehicle and the durability of the vehicle
- In future we can make flexible seating arrangement which would be more comfortable and easy to go

8. CONCLUSION

Compressed air technology allows engine that are both non-polluting and economical this report the effective application of pneumatic power. Pneumatic vehicle will replace the battery operated vehicle used in industries. Pneumatic powered vehicles requires very less time for refueling as compared to battery operated vehicle. This is totally clean, light weight circuit can work in hazardous environment and requires less maintenance.

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10. REFERENCES

1. Mr.S.Anirudh Addala and Mr. Srinivasu Gangada, Vishwanadha Institute of Technology Management, Fabrication and Testing of Compressed Air Car, Global journal INC, (USA); Year-2013.
2. Mr.S.S.Verma, S.L.I.E.T., Longowal; "Latest Developments of a Compressed Air Vehicle: A status Report'; Global journal INC, (USA); Year- 2013.
3. Dr.S.S.Thipse; "Compressed air car"; Tech Monitor; Nov-Dec 2008.
4. Mr.B.R.Singh and Mr.Onkar Singh; "Study of compressed air as an alternative to fossil fuel for automobile engines".
5. Mr.Ruchil.A.Patel;" A Study on Compressed Air Engine Technology: A Review"; International Journal of Advanced Technology in Engineering and Science Volume No. 03, Special Issue No.01, April 2015.