



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 Issue: III Month of publication: March 2019

DOI: <http://doi.org/10.22214/ijraset.2019.3428>

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Design & Development of Power Transmission Mechanism of Air Power Cycle

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Abstract: This paper is on Design & Fabrication of a Tri-cycle that runs on compressed air. The whole body looks like an complete tri-cycle except the manual operation is replaced by an automatic operation using pneumatic wrench as a power source for the tricycle. This tri-cycle can be used for handicapped people as well as industrial workers who need to travel short distances and to carry load and equipments. Only one person is allowed on this tri-cycle. This concept of compressed air tri-cycle in practice reduces the air pollution to large extend as its exhaust is nothing but air.

Keywords: Tri-cycle, Compressed air, Automatic, Air pollution.

I. INTRODUCTION

Nowadays the world is suffering from many environmental problems and depletion of conventional fuels. Automobile field works on a large amount of fossil fuels with somewhat lower efficiency. However the consumption of fossil fuels results and transforms in to many serious environmental problems. To reduce such environmental problem, the use of renewable energy sources like solar energy, wind emphasis on the use in automotive vehicle. As the conventional tricycle requires human strength and effort to be applied on the pedals to propel the vehicle. We intend to develop and fabricate an automated tricycle that uses compressed air pressure as a source of power. The pneumatic system deals with the use of air pressure along with its control system for moving things also provide clean system. Tricycle is an compressed air operated vehicle which has a one person capacity and are specially designed for the purpose of low mobility.

II. LITERATURE REVIEW

Andrew Papson et.al, studied the potential performance of CAVs in terms of fuel economy, driving range, carbon footprint, and fuel costs and examines their viability as a transportation option as compared with gasoline and electric vehicles. Subjects of analysis include energy density of compressed air, thermodynamic losses of expansion, CAV efficiency on a pump-to-wheels and well-to-wheels basis, and comparisons with gasoline and electric vehicles. Results show that although the CAV is a bold, unconventional solution for today's transportation challenges, it is ultimately not workable, and compares poorly with gasoline and electric vehicles in all environmental and economic metrics. Further, applications of the CAV are severely constrained because of its limited driving range. The results from this study, including the analysis of energy density and expansion losses, may be used to identify future opportunities for CAV applications. The pump-to-wheels and well-to-wheels methodology contained here establishes a framework for evaluating future CAV designs^[1].

Saurabh Pathak et.al, did research on the heavy vehicles are known for producing a large amount of harmful gases like Co₂, SO₂etc., which act as the major source for global warming. So research is going on to find a light weight vehicle which does not pollute the environment. One of the alternatives is the use of compressed air to generate power to run an automobile. Due to the unique and environmental friendly properties of air, it is considered as one of the future fuels which will run the vehicles. So in this paper an effort is made to study the extent of research done and the potential advantages and disadvantages of the compressed air technology. This paper explores the effective application of pneumatic power^[2].

Rakesh P. Shende et.al, worked on a pneumatic vehicle, useful for handicapped people, equipped with pneumatic ratchet, pressure regulator, DC air compressor, air tank, chain sprocket transmission drive. The power transmission takes place from ratchet to rear wheel through chain drive. Only one person allowed on the Tricycle at any time. Modification by attach support is to make structure more strong at critical point. The materials, mild steel is choose as a main structure fastening by joint. Components of model attach by bolt and nut. Part by part create then be fabricate together. At the end of the project, the model tested by several people and their comment then being recorded and performed some tests^[3].

Rahul Sharma et.al, studied on a pneumatic tricycle, which can be used for handicapped people as well as industrial workers who need to travel short distances and to carry load, equipped with pneumatic wrench, pressure regulator, Air compressor, air receiver tank, chain and sprocket transmission drive. It is an real wheel drive vehicle in which the power transmission takes place from pneumatic wrench to the rear wheel through a chain drive. Pneumatic tricycle is stable, operated quietly and is

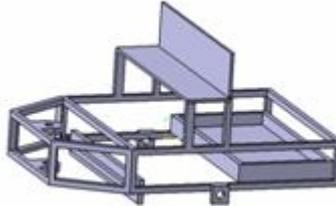
smooth, and gave users the feeling of being in control of the vehicle. The Ergonomic evaluation also demonstrated that Pneumatic tricycle is easy to use in normal use situations, including situations involving obstacles, for a broad cross section of users^[4].

Rahul Jeughale et.al, Studied to design & fabricate vehicle running on air pressure for material handling in industries and reduce power consumption. It is rear wheel drive. He develop the concept of pneumatic vehicle from pedal operated tricycle. The vehicle looks like three wheeler in which manual operation is replaced by compressed air pressure^[5].

III. INTEGRATED PARTS

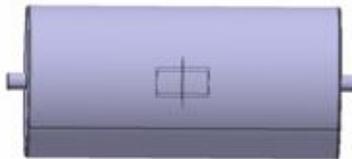
A. Frame:

A frame is often a structural system that supports other components. The frame of a vehicle is basically chassis. It is the skeletal system of vehicle. To construct by fitting and uniting the part of a structure.



B. Storage tank:

The air storage tank is used as a reservoir of compressed air. The air required for the circulation in the system is supplied from this tank. An air receiver tank is an integral and important part of compressed air system. The receiver tank acts as a reservoir of compressed air for peak.



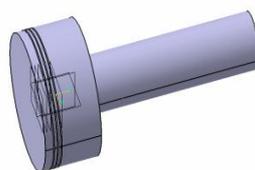
C. Wheel:

A circular object connected at the centre to a bar, used for making vehicle.



D. Piston

A piece of metal in an cylinder. That fits tightly inside the cylinder. The piston moves up and down in the cylinder.



E. Pneumatic Actuator:

The compressed air is fed in one direction of actuator which reciprocates the piston to and fro by the impact of high pressure air. Cylinder is manufactured generally from Aluminum & aluminum alloys with central bore on lathe machine.



IV. CONCLUSION

The vehicle is in early stage of development but it holds a lot of promise and provides scope for further research. The tricycle which we have designed and manufactured is eco-friendly and does not cause pollution. This tricycle will help in reducing the problems of global warming. It uses non-conventional energy source i.e. atmospheric air. This will help to save the non-renewable source of energy. Pneumatic vehicle can prove solution to depleting natural resources and can be the technology of tomorrow.

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