
Fabrication of a Device Used For Producing Compressed Air Using Vehicle Suspension

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ABSTRACT

This Paper includes how the compressed air is produced by using vehicle suspension. We know Pneumatic energy is the readily available and low cost energy. Now-a-days Non-conventional energy system is very essential to the world. So here we are focusing on pneumatic type of energy for this project. In this project compressed air can be produced with the help of vehicle suspension system. Then this compressed air is used to operate the vehicle. Compressed air production using suspension system does not require any fuel for its motion. This air operated vehicles are the new innovative concept to run vehicle by using the compressed air. So in this paper we are making one type of device that is used for producing compressed air for different purposes by using vehicle suspension. The compressed air may be used for running the vehicle and for air conditioning purposes. Here we start with an introduction to pneumatic; it's various applications and units and briefly explains a few devices capable of utilizing air effectively and their relative merits. The pneumatic operated vehicle is very useful to save the conventional type of fuel and after few years these things will play a very important role.

Keywords: *compressed air, pneumatics, Non-conventional energy*

1.0 INTRODUCTION

Compressed air is a gas, or a combination of gases, that has been put under greater pressure than the air in the general environment. Current applications using compressed air are numerous and diverse, including jackhammers, tire pumps, air rifles, and aerosol cheese. According to proponents, compressed air also has a great deal of potential as a clean, inexpensive, and infinitely renewable energy source. Its use is currently being explored as an alternative to fossil fuels. Pneumatic energy is the readily available and low cost energy. Non-conventional energy system is very essential at this time to the world. So In this project compressed air was produced with the help of vehicle suspension. Then this compressed air is used to operate the vehicle. Compressed air production using vehicle suspension does not require any input power to produce compressed air. ^[1]

2.0 LITERATURE REVIEW

Sivanantham.K 1, Banuchandar.N2, Hariprakash.K 3, Jeeva.M., Vehicles, derived from the Latin word, vehiculum, are non-living means of transport. Vehicles may be propelled or pulled by animals, for instance, a chariot, a stagecoach. However, animals on their own, though used as a means of transport, are not called vehicles, but rather beasts of burden or draft animals. This distinction includes humans carrying another human, for example a child or a disabled person. A rickshaw is a vehicle that may carry a human and be powered by a human, but it is the mechanical form or cart that is powered by the human that is labelled as the vehicle. For some human-powered vehicles the human providing the power is labelled as a driver. Vehicles that do not travel on land often are called craft, such as watercraft, sail craft, aircraft, hovercraft, and spacecraft Land vehicles are classified broadly by what is used to apply steering and drive forces against the ground: wheeled, tracked, railed, or skied. While Vehicle running on the road ways, foot pump produces air in vehicle suspension. Generated air is stored in a tank. Here we are fabricating the model for four wheeler vehicles without using any fuel input, and it is known as pneumatic vehicle. The arrangement of the setup is using the pneumatic rotor (or) gun which is coupled with the worm shaft. The spur gear is connected with the rear wheel shaft which is engaged in the worm shaft. The front wheel drive is to make as the mechanism of rack and pinion which is coupled with the steering shaft. ^[2]

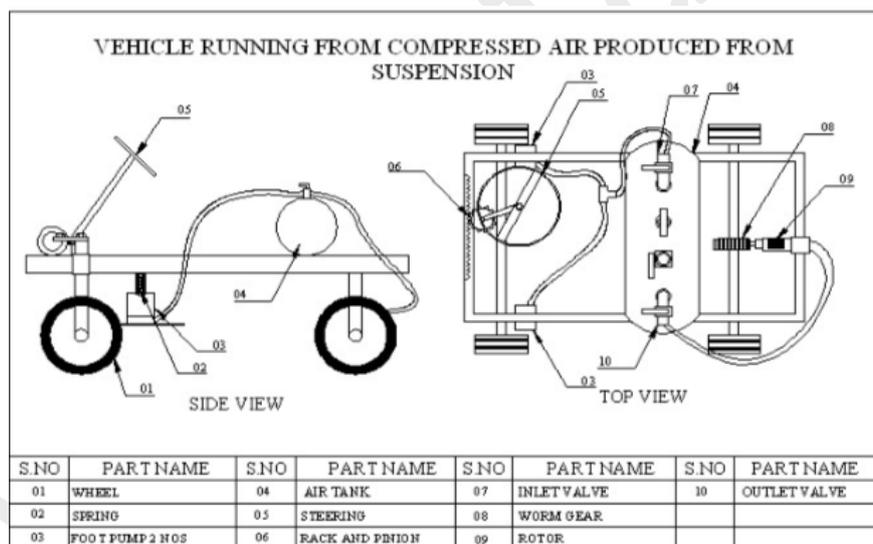


Figure 1 Vehicle Running From Compressed Air

S.Vigneswari, V.Vinodhini ,In this project we are collecting air cylinder and store this energy to the compressor tank as non-conventional method by simply driving the vehicle. Non-conventional energy system is very essential at this time to our nation. Compressed air production using vehicle suspensor needs no fuel input power to produce the output of the air. For this project the conversion of the force energy in to air. The control mechanism carries the air cylinder (vehicle suspensor), quick exhaust valve, Non-return valve and spring arrangement. We have discussed the various applications and further extension also. The initial cost of this arrangement is high ^[3]

Borse S.H., Satpute A.G., Explained about air conditioning system by using vehicle suspension. When vehicle is run on bumpy road or uneven road then suspension spring move

continuously up and down. The pneumatic cylinder is installed below this spring arrangement. This pushing power is supplied to pneumatic piston and cylinder arrangement which compresses the air. This compressed air is supplied to air tank through non return valve. By the placement of non return valve stops the back flow of pressurized air into cylinder again. That high pressurized compressed air is stored in air tank. When we want to turn on A.C. system the pressurized compressed air is supplied to parallel flow heat exchanger through pipe by using knob. ^[4]

2. DESIGNING OF THE PROJECT

Design is the creation of a plan or convention for the construction of an object or a system. The total system is designed by taking the following equipments.

2.1 Foot Pump

A bicycle pump is a type of positive-displacement pump specifically designed for inflating bicycle tires. It has a connection or adapter for use with one or both of the two most common types of valves used on bicycles

2.2 Air tank

A pressure vessel or storage tank is a closed container designed to hold gases or liquids at a pressure different from the ambient pressure. The pressure differential is potentially dangerous and many fatal accidents have occurred in the history of their development and operation. Consequently, their design, manufacture, and operation are regulated by engineering authorities backed up by laws.

2.3 Springs

The automobile chassis is mounted on the axles not direct but through some form of springs. This is done to isolate the vehicle body from the road shocks which may be in the form of bounce, pitch, roll or sway. All the parts which perform the function of isolating the automobile from the road shocks are suspension system otherwise the ride is uncomfortable.

2.4 Hoses & Connectors

Hoses used in this pneumatic system are made up of polyurethane. These hose can with stand at a maximum pressure level of $10 \times 10^5 \text{N/m}^2$.

2.5 Non-Return Valve

A check valve, clack valve, non-return valve or one-way valve is a mechanical device, a valve, which normally allows fluid (liquid or gas) to flow through it in only one direction. Check valves are two-port valves, meaning they have two openings in the body, one for fluid to enter and the other for fluid to leave.

2.6 Pressure gauges

Pressure gauges are usually fitted with the regulators. So the air Pressure adjusted in the regulator is indicated in the pressure Gauge, is the line pressure of the air taken to the cylinder.

3.0 MATERIALS REQUIRED

The raw material requirements for this project are as follows:

Equipment name	number
Air pump	1
Spring	4
Pressure gauge	1
Hose and pipe	1
Frame	1
Air tank	1

Table -1 raw material requirements

4.0 Steps in Fabrication

1. Collecting raw materials
2. Cutting in to desired size
3. Fabricating plate to form a frame
4. Mounting the springs
5. Fabrication of air pump to the frame
6. Placing a pressure gauge to pump
7. Take trial run



Figure: 2 Figure 24 front view of practical model

5.0 FLOWCHART OF WORKING

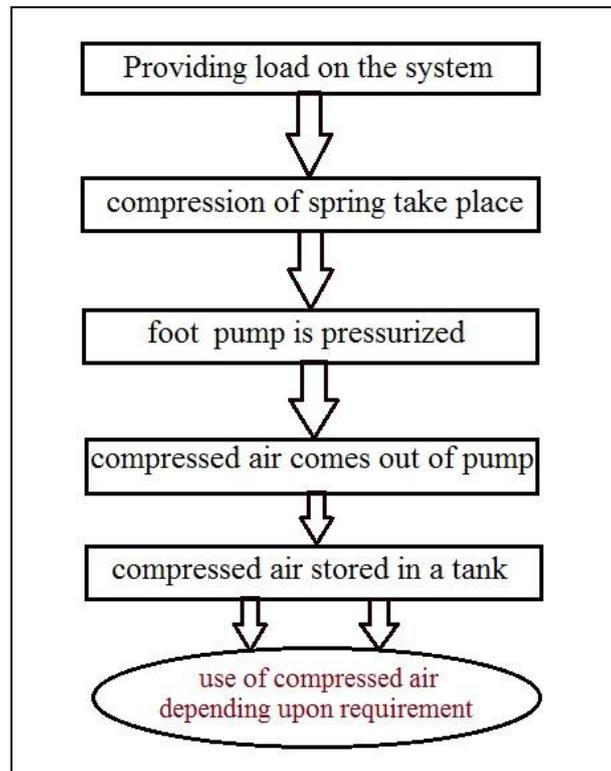


Figure: 3 Flowchart Of Working

6.0 RESULT AND DISCUSSION

6.1 Advantages of Compressed Air Used in a Vehicle

- Air production is simple for running the vehicle
- No fuel is required
- electrical power input is not required
- It is a non-conventional system
- No pollution
- No moving parts
- No lubricating oil required

6.2 Disadvantages of Compressed Air Used in a Vehicle

- System is bulky
- high Initial cost
- more space required
- leakage problems are high

6.3 Applications of compressed air

- Applicable in all vehicles.
- For cleaning & inflation of tubes.
- Swing machine.
- Compress air can use for pneumatic braking system.

7.0 CONCLUSION

As we know that Pneumatic energy is the readily available and low cost energy. Non-conventional energy system is very essential at this time to the world. So In this project compressed air was produced with the help of vehicle suspension. Then this compressed air is used to operate the vehicle. Compressed air production using vehicle suspension does not require any input power to produce compressed air. This air operated vehicles are the new innovative concept to run vehicle by using the compressed air system. The above project is made with pre planning, so that it provides compressed air for various operations like running of vehicle, air-conditioning etc. The project "FABRICATION OF A DEVICE USED FOR PRODUCING COMPRESSED AIR USING VEHICLE SUSPENSION" is designed and fabricated with the hope that it is very much economical and help full to all vehicles to produce the compressed air.

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