LITERATURE REVIEW ON COMPRESSED AIR GENERATION BY USING VEHICLE SUSPENSION

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Abstract

In today automobile and industrial world, Pneumatic system play a vital role, it is actually and arrangement of different elements in order to regulate, direct, sense and command itself to achieve the desired result. In Pneumatic system working media is fluid power. The term fluid power related to the employment of fluid media under control conditions to perform some useful work. Fluid power in industries has been important in the development of automatic machinery and equipment for the use in industrial plants. The fluid media for power transmission has many advantages over the media of power transmission. As a part of literature review different total presentation have been collected from the journals. This paper have been found to the co-related to project topic.

In this project we are collecting air from the 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. So we are focusing on pneumatic type of energy for this project. "Compressed Air Production Using Vehicle Suspensor" needs no fuel input power to produce the output of the air. This system gives smooth operation and smooth movement for vehicle. Suspension system during the time of vehicles running the rack slide up and down. Then this compressed air can be used for further application.

Keywords: Peeling, Motorized, Motor, Belt, Sharp Blade.

I. INTRODUCTION

In front-engine rear-drive vehicles, the front beam axle was replaced by independently mounted steerable wheels. The wheels were supported by short the Contains. The will be upper and lower hinged arms holding them perpendicular to the road as did the previous axle beam designs. A coil spring was used to support either the upper or the lower arm to provide dampening. Shock absorbers began to be used to dampen shock loads and also to provide resistance to spring oscillations. The suspension systems are used in vehicle to support weight of vehicle body and to isolate the vehicle chassis from road disturbances. In this method air is collected and stored in the compressor tank as nonconventional method. Compressed air production needs no fuel input power to produce the output of the air. In this project the conversion of force energy in to air is done.
force energy into air is done. The output air from the pneumatic cylinder is collected through quick exhaust valve and non-return valve and inside spring arrangement the suspension system used for the regeneration of vibration energy is called regenerative suspension.

WORKING PRINCIPLE

The main components involved in this project consists of foot pump, air tank, hoses and connectors, pressure gauge, spring, non-return valve, wheel, battery, dynamo, rack and pinion and vehicle setup. When the vehicle runs on the irregular roads then the wheel goes up and down motion. The cylinder arrangement is attached on the wheel axle. This motion is used to suck the air from the atmosphere. Thus the piston inside the cylinder creates the internal pressure which results in storage of air to the tank at certain pressure. This pressurized air is saved inside the tank. The outlet of tank consists of four valves which are used to supply the air to other pneumatic applications. Here the non-return valve is used to avoid the reversing of air flow to the atmosphere. That compressed air is used to run the vehicle using pneumatic gun. Pneumatic gun is coupled to the rear axle using worm drive for vehicle wheel rotation. Simultaneously generate the electrical power using rack and pinion setup. Rack is welded to the foot pump cylinder. If the vehicle runs on the irregular roads, suspension occurs. On that time foot pump cylinder welded with the rack goes up and down, If rack moves attached to the pinion gives rotational motion. Dynamo is coupled to pinion for power generation. That power is stored in the battery.

Description: - The proposed solution is to produce a new design for cars’ shock absorbers that would help car users get access to tires pumping machine without having the need to stop by a car station. The new design would have the function of conserving the compressed air produced by the product in a tank equipped to the car. The product’s efficiency relies in the minimized time it takes on the road for it to fill completely. The tank then respectively provides the tires with the air needed when the vehicle is in a static position. The idea comes from the translation movement that the shock absorbers perform when the car is driven, so it can make a compressor produce compressed air. The compressed air can then be used to pump car tires that are depressurized. This system will use the information generated from the sensors of the TPMS that indicates the pressure inside the tire, then warn the driver to stop the car and proceed with connecting the tires to the compressed air tank. The information provided by the TPMS will constantly help the driver regulate the tire pressure before it reaches any dangerous situation.

II. LITERATURE REVIEWS

After reviewing the various research paper relevant to Compressed air generation by using vehicle suspension, the conclusions are stipulated below.

[1] V.P.SINGH: In this research paper author given that to the Pneumatic energy is the readily available and low cost energy. Non-conventional energy system is very essential at this time to our nation. So the pneumatic energy is considered for our project.

In this project compressed air can be produced with the help of to and fro motion of suspension.

- Compressor Air operation
- Actuator
- Renewable
- Solenoid valve

[2] V.B.BHANDARI: In this research paper author given that to this compressed air is stored in air tank and further utilized in other application the vehicle, such as pneumatic jacks, dense air in air conditions and carburetor with the help of battery operated solenoid valve. Compressed air production using vehicle suspension needs no extra fuel input power to generate the compressed air. This air operated four wheeler is the new innovative concept to run vehicle accessories by using the compressed air system within the vehicle itself. Begins 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, we have taken a solenoid valve for showing the pneumatic jack application in prototype.
[3] V. Vinodhini: In this research paper author given that to the pneumatic operated vehicle is very useful for drive the four wheel drives suspension.

Air is the working substance of our project. The aim of our project is to gives smooth operation and smooth movement for vehicle's integral part of application.

Our project model consists of air tank, suspension, Pneumatic Actuator, solenoid valve and total prototype model.

[4] Krishnan, R. et al.: In this research paper author given that generally compressed air is produced using different types of air compressors, which consumes lot of electric energy and is noisy.

In this paper, an innovative idea is put forth for production of compressed air using movement of vehicle suspension which normal is wasted.

The conversion of the force energy into the compressed air is carried out by the mechanism which consists of the vehicle suspension system, hydraulic cylinder, Non-return valve, air compressor and air receiver.

We are collecting air in the cylinder and store this energy into the tank by simply driving the vehicle. This method is non-conventional as no fuel input is required and is least polluting.

[5] Rajesh Kumar Sahu: In this research paper author given that in the automobile, the wasted energies are exhausted flue gases, wheel rotations & suspension travel.

From above exhaust flue gas energy is used to increase the efficiency of engine with the help of Turbo charger and also the wheel rotations are used in Dynamo.

In this project we are going to utilize the wasted energy in suspension travel to generate compressed Air.

This can be achieved by conversion of displacement of damper of suspension system into force with the help of hydraulic lines.

[6] Abhijit Lendhe: In this paper author given that

The input force i.e. the weight of unsprung mass of vehicle is given with help of lever arrangement.

That force is transfer to cylinder-1 with the help of piston cylinder arrangement. Cylinder-1 is partially filled with hydraulic fluid.

Input force is transmitted from cylinder-1 to cylinder-2 by hydraulic fluid. Cylinder-2 is partially pneumatic & partially hydraulic.

N cylinder-2 air is sucked from atmosphere, where it gets compressed during extension stroke of cylinder-2.

That compressed air can be stored in Air Receiver.

Two NRV’s are used at the inlet & exhaust of Air. For force transmission from cylinder-1 to cylinder-2, the hydraulic lines are selected.

[7] M. Haslehurst: In this research paper author says that an innovative machine has been designed by Quality Function Deployment (QFD).

- Which based on coconut farmer's community requirements to determine the parameters of design.
- A survey to identify population and sample, choosing survey method, design questionnaire and distribute the questioner were done to collect coconut farmer's community needs.
- Afterwards Home of Quality (HOQ) is introduced to design to meets the requirements.

[8] R. S. Kurmi: In this paper author says that

- Here we fabricate the model of compressed air production using vehicle suspension. Man is need of energy at an increasing rate for his sustenance and wellbeing ever since he came on the earth a few million years ago.
- Primitive man required energy primarily in the form of food.
- He derived this by eating plants or animals, which he hunted.
- Subsequently he discovered fire and his energy need increased as he started to make use of wood and other bio mass to supply the energy needs for cooking as well as to keep himself warm.
- After several years, man started to cultivate land for agriculture. He added a new dimension to the use of energy by domesticating and training animals to work for him.
In this project, we are collecting air from the air cylinder and store it as energy to compressor tank as non-conventional method by simply driving the vehicle.

### III. CONCLUSION

In this project, the aim is to produce an innovative design of car shock absorbers that integrate a compressor that is capable of producing enough compressed air to pump tires. A vehicle equipped with this system has practically self-inflating tires. The product relieves its users from many burdens such as the inconvenience of checking tire pressure regularly, the cost of changing tires because of damage due to under-inflation, etc. The project is still in project, and many tasks are still to be performed. The most important and crucial part of the project is the analysis that would produce the necessary dimensions to design the compressor. The analysis is still unfinished due to many variables that intervene in the functioning of the system. The design and modelling is relatively easy to complete once dimensions are retrieved from the analysis. In addition, industrial drawings are still to be generated once the modelling using computer aided modelling software. Finally, a simulation of the resistance of the material to friction and heat is pending as well.

### IV. SCOPE

Conventionally, the vibration energy of vehicle suspension is dissipated as heat by shock absorber, which wastes a considerable number of resources. Regenerative suspensions bring hope for recycling the wasted energy. Systems require further research to develop a better system that will capture more energy; in future, designers and engineers will perfectly design the regenerative suspension systems, so these systems will become more and more common. All vehicles in motion can benefit from these systems by recapturing energy that would have been lost during compression and expansion of suspension.

### V. REFERENCE

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