

Design and Fabrication of Automatic Tyre Pressure Monitoring System

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Abstract--An Automatic Tire Pressure Control System compensates for fluctuations in the air pressure and temperature of vehicle tires and automatically adjusts the tire pressure. This provides the vehicle operator with a convenient means to automatically regulate the pressure of a vehicles ' tires for optimum safety and performance. Tire inflation pressure and tire temperature are important safety parameters for automobiles, trucks and other vehicles. Proper tire inflation pressure and temperature regulation are necessary to insure safe traction on slippery road conditions and to prevent excess wear on tires. The main purpose of the invention is to provide a reliable, economical and energy efficient means of providing air to the tires of vehicles and to improve the safety, handling and operation of the vehicle by means of regulating tire.

I. INTRODUCTION

The use of automobiles has been increasing day-by-day .Humans are completely relation automobiles for transport purposes. In today's competitive automobile sector; various automobile industries are competing with each other in order to win the hearts of humans. In order to do so the companies are making the system more effective by improving the safety systems in cars. The more reliable the system is, more successful the car becomes. After the discovery of wheels by man, it has been used extensively for variety of purposes. Wheels have become the vital part of human lives since ages. The effective use of wheels with more innovative ideas further developed with developing technologies. One such upcoming technology is automatic tire pressure maintaining system used in automobiles. This system is used to maintain the pressure of tires in running condition.

The design presented in the report herein functions to restore the tire pressure on vehicles so that they are kept a top time pressure levels, thus extending the ire life time at the same time saving the owner from fuel costs and maintenance cost incurred with under inflated tires. With the help of suspension system we compress the air through a compressor and use the compressed air for maintaining the tire pressure. An Automatic Tire Pressure Control System compensates for fluctuations in the air pressure and temperature of vehicle tires and automatically adjusts the tire pressure. This provides the vehicle operator with a convenient means to automatically regulate the pressure of vehicles' tires for optimum safety and performance.

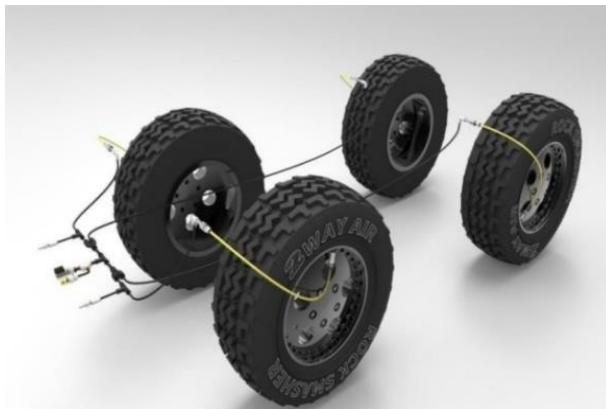


Figure 1.1 AUTOMATIC TYRE PRESSURE INFLATION SYSTEM

II.OBJECTIVES

The objectives of the proposed system are given below:

Maintains the required tire pressure: The function of the system is to maintain and adjust the pressure in all the types of the system according to varying loading and driving conditions. To adjust the pressures in all four tires of a Passenger vehicle to obtain

The proper pressure for varying road/driving conditions. An Automatic System: An automatic system further saves human energy & time in filling the air in types when they are in under inflated conditions. Builds a

Low cost system: The installation of such a system in vehicles is a low cost affair. Improves fuel efficiency & tire life: This system helps in less consumption of fuel and also improves type life by reducing chances of wear in type.

Ability to Provide Automatic System: A third objective is to provide all of the said benefits to the user through an automatic system, thus minimizing user intervention. Specifically, it is desired that the system automatically increase or decrease the tire pressures for the given road conditions.

1. DESIGN OF AUTOMATIC TYRE PRESSURE INFLATION SYSTEM

The aim of this study is to design and fabricate a system which works on automatic filling of air into a type that is in running condition with a low cost device. It automatically checks the pressure inside the type with the help of a relief valve. It ensures that types are always properly inflated to improve type life, human safety, reduction of gas mileage and vehicle performance.

As the wheel is in rotating condition while filling air into it, the rotary joint is fixed between wheel spindle and wheel hub at each wheel so that there is no tangling of hoses. The valve used with the type is a one way valve so that inside air should not escape from it.

III. PNEUMATICS NEED OF COMPRESSED AIR

The word 'pneumatic' comes from Greek and means breather wind. The and equipment. Pneumatics has for some considerable time been used for carrying out the simplest mechanical tasks in more recent times has played a more important role in the development of pneumatic technology for automation. Pneumatic systems operate on a Supply of compressed air which must be made available in sufficient quantity and data pressure to suit the capacity of the system. When the pneumatic system is being adopted for the first time, however it will indeed be necessary to deal with the question of compressed air supply. The key part of any facility for supply of compressed air is by means using reciprocating compressor. A compressor is a machine that takes in air, gas at a certain pressure and delivered the air at a high pressure. Compressor capacity is the actual quantity of air compressed and delivered and the volume expressed is that of the air at intake conditions



namely at atmosphere pressure and normal ambient temperature.

Figure 6.1 AUTOMATIC PRESSURE MONITORING SYSTEM PHOTOGRAPHY

The compressibility of the air was first investigated by Robert Boyle in 1662 and that found that the product of pressure and volume of a particular quantity of gas. The usual written as

$$PV=C \text{ (or) } P_1V_1=P_2V_2$$

In the equation the pressure is the absolute pressure which for free is about 14.7Psi and is capable of maintaining a column of mercury, nearly 30 inches high in an ordinary barometer.

Any gas can be used in a pneumatic system but air is the mostly used system now a days.

1. DESIGN OF AUTOMATIC TYRE PRESSURE INFLATION SYSTEM

The aim of this study is to design and fabricate a system which works on automatic filling of air into a tyre that is in running condition with a low cost device. It automatically checks the pressure inside the tyre with the help of a pressure sensor. It ensures that tyres are always properly inflated.

Prove tyre life, human safety, reduction of gas mileage and vehicle performance.



Figure 7.1 TYRE INFLATION

IV. CONSTRUCTION AND WORK

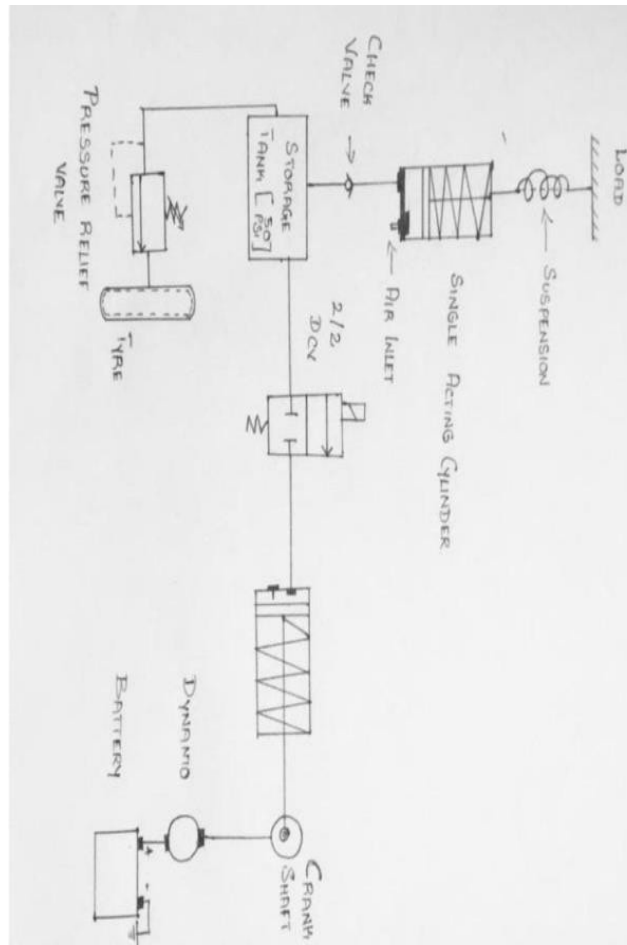


Figure 8.1 CONSTRUCTION ANDWORKING

1.1 SUSPENSION

Suspension is the system of tires, tire air, springs, shock absorbers and linkages that connects a vehicle tous wheels and allows relative motion between the two the design of the front and rear suspension of a car may be different. The job of a car suspension is to maximize the friction between the types and the road surface, to provide steering stability with good handling and to ensure the comfort of the passengers.

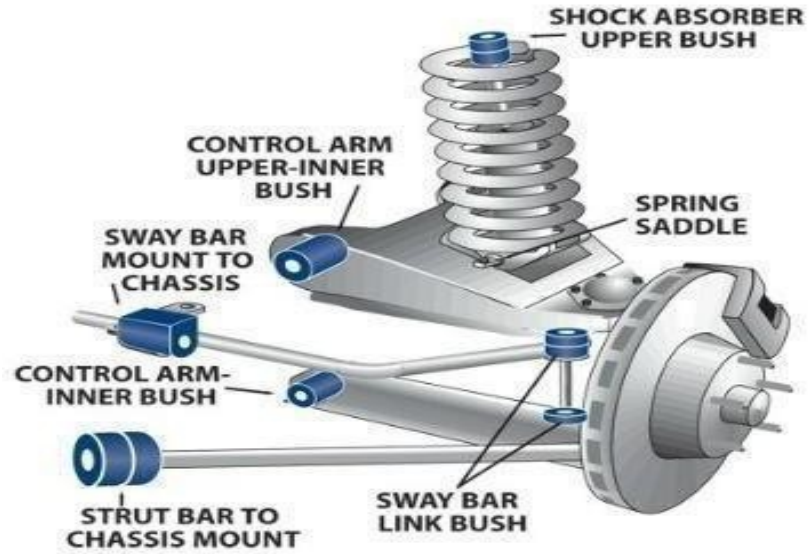


Figure 8.1 SUSPENSION

Air storage tanks are used to hold compressed air. The number and size of air tanks vary among vehicles. The tanks will hold enough air to allow the brakes to be used several time seven if the compressor stops working.



1.3 Figure 8.2 STORAGE TANK

2. *BEARING*

Journal or plain bearings consist of shaft or journal which rotates freely in a supporting metal sleeve or shell. There are no rolling elements in these bearings. Their design and construction may be relatively simple, but the theory and operation of these bearings can be complex. This article concentrates on oil- and grease-lubricated full fluid film journal bearings; but first a brief discussion of pins and bushings, dry and semi-lubricated journal bearings, and tilting-p



Figure 8.3 BEARING

3. *COMPRESSOR*

The system uses a compressor to get the air from the atmosphere & to compress it to a required pressure. A 12V DC compressor has been used in our system. It is perfect for cars, bikes and inflators. It operates from the cigarette lighter socket of a DC12V.

Proper design has been set up for installing hose and cord. It is ideal for inflating all vehicle tires and other



high-pressure inflatables. The following table shows the specification of our portable compressor.

Figure 8.4 COMPRESSOR

4. *CHECK VALVE*

A check valve relies on a pressure differential to work. They require higher pressure on the input side of the valve than the output side to open the valve. When the pressure is high on the outlet side (or the input side

pressure is not high enough), the valve will



Figure 8.5 FALCOON CHECK VALVE

5. *WHEEL*

A wheel is a circular block of a hard and durable material at whose center has been bored a hole through which is placed an axle bearing about which the wheel rotates when torque is applied to the wheel about its axis.



Figure 8.6 WHEEL

6. PRESSURE GAUGE

A wheel is a circular block of a hard and durable material at whose center has been bored a hole through which is placed an axle bearing about which the wheel rotates when torque is applied to the wheel about its axis.



V.CONCLUSION

In this report, an analytical model is presented for automatic type pressure maintaining systems. Some of the parameters involved in this model can be determined quite easily (geometric parameters), while others, which are more delicate, depend directly on the type of friction occurring in the mechanism (and therefore on the friction coefficients), which affects the mechanical losses to a variable extent. After this initial numerical approach, an experimental study shall be performed in order to obtain more realistic values for some of the parameter and confirm some of the assumptions made here in the modeling procedure. The use of vehicles as a mode of transport is notably growing by day and the ultimate goal of the engineering discipline would be to ensure satisfactory service provision. Proper and efficient type pressure maintenance is one of the answers to such end favor and such this design project contributes to an idea that can be implemented and be of great savings to motorists.

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