Abstract

After going through various studies it has been shown that a drop in a tyre pressure by just a few PSI can result in the reduction of gas mileage, tyre life, safety & vehicle performance, we will developing an automatic tyre inflating system that insure that tyres are properly inflated at all time. Our design implements the use of a digital compressor that will supply air to all four tyres, and the rotary joint effectively allow air to be pass without leak. With the help of hydraulic jack, puncture tyre will be easily removed and it also useful for maintenance purpose. In this system we convert hydraulic jack into motorized jack with the help of motor for convenient purpose.

I. INTRODUCTION

The mode of transport is one of the most important criterions these days. The vehicles safety is thus essential. Accidents are also increasing at a quick pace. There are several factors which causes these accidents. The improper inflation of tyres is one among them. Tyres lose
air through normal driving (especially after hitting pot holes or curbs), permeation and seasonal changes in temperature. When tyres are under inflated, the tread wears more quickly. Under inflated tyres get damaged quickly due to overheating as compared to properly inflated tyres. The under inflation also causes a small depreciation in the mileage as well. Above all the vehicles running with under inflated tyres can cause accidents.

Thus to rectify all these defects we are using automatic tyre inflation systems. With this system tyre pressure is constantly maintain. Digital air compressor is use where tyre pressure is set and after tyre pressure reaches the desired pressure then the compressor auto cut off. Rotary joint is rotate with the tyre that’s why we uses hydraulic jack to check the rotary joint after specific period and hydraulic jack is also use for maintenance purpose.

II. COMPONENTS AND ITS SPECIFICATIONS
The working principle of Tyre Inflation System is that compressed air is passed through rotary joint into the nozzle fitted in the rim of the wheel. The rotary joint thus allows the air to flow through itself providing the rotary motion to the wheel assembly.

- **COMPRESSOR**: uses of digital air compressor of 300 psi which supply the air to all the four tyre. If we set the tyre pressure then after its reaches the desired pressure compressor automatic cut off the air supply.

- **ROTARY JOINT**: use of air filling tube with the help of bearing. When the compressor passes the air through its pipe then that air is passes through the shaft which having bearing in fitted inside it. This shaft is fixed to the main shaft and when wheel rotate the bearing inside the shaft rotates and air passes to the wheel without leakage of air.

- **HYDRAULIC JACK**: because of rotary joint is always rotates with the wheel, it has to maintain propely and that’s why we employed hydraulic jack system, it also useful when tyre get punctured. It required inimal pressure to lift the car, human effort is reduces with this system.

- **BEARINGS**: in this system we uses two bearing, one is connected with the shaft above which tyre is mounted. Because of this bearing tyre is rotate. Another bearing is fitted inside the rotary joint. When tyre rotate then this bearing rotate.

III. DESIGN AND WORKING
Figure shows the overall design of system. In this system tyre is mounted on shaft with the help of bearing. And valve of tyre is connected with the pneumatic tube which is connected to the one end of rotary joint. Another end of rotary joint is connected to another pneumatic pipe which is coming from the compressor and the jack is mounted below the the shaft to lift the tyre.

Once we set the pressure in the compressor the compressor fill the air in tyre in running condition of wheel and these is possible because of rotary joint which rotate
with tyre. After reaches the set pressure the compressor is automatic cut of the air means does not pass air to the wheel. Hydraulic jack is used to reduce the human effort. When tyre get punctured or we need to maintenance of rotary joint or for car maintenance hydraulic jack is more beneficial.

IV. ADVANTAGES & LIMITATIONS
1. There will be reduction of tyre wear because of uniform pressure in the tyre.
2. It increases fuel economy
3. The main beneficiaries from this system will be vehicles owners
4. Reduces human effort
5. Increases human safety
6. Providing sufficient air flow to the tyre with minimal leakage
7. With increase in fuel economy for passengers vehicles and demand for the petroleum fuel will be reduce.
8. As this device is not used in majority of vehicles, the market condition would be favourable for the introduction of a tire inflation system.
9. It will provide sufficient airflow to the tire with minimum leakage
10. Despite an initial investment, there will be reduction in cost due to reduced tire wear and an increase in the fuel economy.
11. With an increase in fuel economy for passenger vehicles and the demand for petroleum fuel will reduce.

LIMITATIONS
1. Life of rotary joint is limited due to continuous in motion and hence need maintenance. Seals used in rotary joint needs to be replaced from time to time.
2. Hydraulic Jack is quite cheap but converting it to electrical jack is quite difficult.
3. And maintaining the hydraulic jack as motorized jack is real problem.

V. CONCLUSIONS
Tyre Inflation Systems have several benefits for the transportation industry and for the vehicle owners. These benefits include, improved vehicle mobility due to improved traction, improved ride quality and cargo safety due to the reduction in vehicle vibrations when the correct tyre pressure is used, reduction in road maintenance, increased fuel efficiency and a considerable increase in the Tyre life of vehicles. Thus Tyre Inflation System should be used in vehicles for the betterment of automobile industry, vehicle owners, passengers and society as a whole. With the help of hydraulic jack human effort will be reduce.

VI. REFERENCES

TO CITE THIS PAPER