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Design and Fabrication of Vehicles Multi Wheel Nuts Tighter and Remover

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Abstract - *The main aim of this project is to design and formulate a four-wheeler nut-removing tool for tightening and removing of four nuts at a time. In this project, our aim is to design and fabrication of four-wheel nut removing hand operated tool for tightening and removing of four nuts in one stroke. The main objective of work is to develop a single tool which used to open multiple nuts in single operation with simple mechanisms, which is widely use during assembling and disassembling of wheels in automobiles. Main problem they have still faced is that it takes more time and hard work to remove the nuts. This study was aimed at designing and fabricating a device that will remove and tighten four-wheel nuts of car tire simultaneously.*

Key Words: **Automotive, wheel nuts, torque, torque wrench, tire, wheel PCD, gear mechanism.**

1. INTRODUCTION

An automobile is one of the most basic and things that one could own. Cars have now become a necessity and it is not only the symbol of luxury anymore. Car maintenance is one of the key factor in determining its life span. This includes a basic knowledge of changing the car's tire. But replacing a punctured tire has always been a challenging job. Vehicle is an important machine in human daily lifecycle. Nowadays, each family has at least one car to make the transportation easier and faster. The main objective of this project is to atomize the labor work in tightening or removing the nuts one by one. This project focuses on the reducing human effort and time consumed for tightening and removing all four nuts of the four-wheeler tire with a single stroke of lever by using multiple operated spanners. Tool is simple in design, easy to use and easily portable along with the vehicle. This device functions on the principle of gear arrangement system. This work may have solved the problem of four nut removal and force usage utilization to some extent without the application of an electric motor or any hydraulic and pneumatic devices. The problem occurs mostly during car operation is the problem with tire puncture. The punctured tire needed to be replaced with spare tire. Therefore, drivers need to know basic knowledge of tire replacement process if such problem occurs. In order to replace the tire, one requires slight skills. The most desired achievement is that, the total effort and time required in the process is very less. It can assemble and disassemble the wheel with the same tool easily. Tool is simple in design, easy to use and easily portable along with the vehicle.

1.1 Problem statement

During tire, disassembling operation the person was supposed to remove individual nuts to remove the tire, which has very high fatigue level. So our aim was to remove all nuts at a time, to reduce human fatigue level. Multi-nut opener is a device designed at developed for loosening or tightening of wheel hub nuts for:

1. Tata Indigo – most common car used in India
2. And Similar PCD wheels

2. WORKING PRINCIPLE

Generally, spur gears are used for transmitting power between non-parallel intersecting shafts. So spur gear arrangement is used for actuating the four socket spanners at a time. Twelve driven gears and one pinion gear are used. The cam and follower mechanism is used for making the project adjustable. For this purpose, radial cam is used because the follower moves in the direction perpendicular to the cam axis. And spherical face follower is used because the side thrust and wear is considerably low.

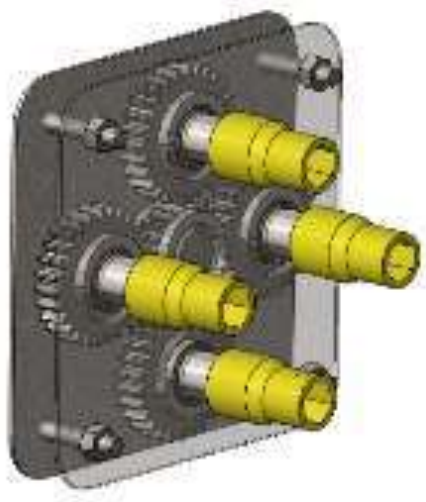

Fig-1: Cad Design of Model

2.1 Advantages

Simple in construction.
Less weight
Less cost
It saves time as compared to other devices.
It can operate easily.

2.2 Applications

Automobile workshops
Automobile Manufacturing units
Garage
Junkyards

2.3 Future scope

It act as a convenient and simple method for tire replacement process thus It is more suitable in using this setup for tire removal in every vehicles for reducing the time consumed and for reducing the man power wasted for the tire replacement and to overcome the emergency situations.

3. CONCLUSIONS

We have introduced one product that is four-wheel multiple-opening spanners for assembling and disassembling of the four nuts in a single stroke of a hand operated lever. We have developed a gear planetary mechanism to reduce the time and effort of the person. Search time was reduced to remove lug nuts consumed. Some of the traditional methods of torque must be applied in a single lug nut off. In this search, the stiffness torque / remove all lug nuts is enough to form a lug / hard nut to remove the wheel. Use the same multi-nut remover is used to remove more than one nuts.

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