

“MULTI NUT REMOVER”

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Abstract

Essentially, Most of cars use four lug nuts to fix wheels on vehicle. The traditional way to change a car's wheel tire is to unscrew the locking lug nuts one by one using a lug wrench. However, sometimes it can be so exhausting and time consuming. In project our aim is to design of 4 wheel nut rotating hand operated tool for tightening and removing of 4 nuts in one stroke. With the increment of number of car on the road, the number of cars problem due to tyre failure has increased. Often, the car is provided with tyre wheel nuts remover for tyre replacement. Due to difficulty in applying torque to remove nut and to save a time. We develop tool having a planetary mechanism. In our project we are tried to focus on the minimization of human effort for fixing all for nuts of 100 mm PCD wheel in one time. The main objective of work is to develop a single tool, which can be made use during assembling of wheels in automobiles. It can be successfully used as standard tool irrespective of the model of the car. It can be used in garages, workshops and service stations. The remover is designed to be ergonomic to be used for easy maintenance, easy storage, easy to handled and able to remove all nuts at once a time. In Automobile industry, Adjustable Unified wheel opener is a special purpose tool made to open and close all the nuts of a wheel in single operation with less effort.

Although various methods are used for open the nuts, they require a lot of effort to open a single nut and also time consuming because you should open/close single nut separately. The main objective of work is to develop a single tool with use to open multiple nuts in single operation with simple mechanisms, which is widely use during assembling and dismantling of wheels in automobiles. It can be successfully used as a standard tool irrespective of the model of the car. Also it can be used in assembly line of automobiles, garages, workshops and as well as service stations.

Keywords

Gear, Bearing, Shaft, Spanner, Socket

Introduction

The main purpose of this project is to atomize the worker work in tightening or loading the nuts one by one. This project centre of attention on the minimization of human effort and time in terminated for fixing all four nuts of the four wheel tire with a single stroke of lever by using multiple operated spanners. In a day-to-day life there are many problems are needs lot of effort and time to do that complete work. A small but crucial work that all people would do often is opening a wheel of a vehicle. It is a fact that a big effort is required to open a single nut of a car wheel and it will become a tedious task to open the wheel in extreme atmospheric conditions. It also creates problem when there is an emergency situation. Here is the solution to the problem mentioned above by Adjustable Unified Wheel Opener, it is a special tool designed for opening a wheel with ease. It is so designed that it can open all the four nuts of a car wheel in one time. And the most desired achievement is that, the total effort and time needed in the process is very less. It can open and also refit the wheel with the same tool easily. Tool is simple in design, easy to use and easily portable along with the vehicle.

This is achieved by developing a spur gear creation as such occurs which take less time and effort for the above mentioned task that is losing or tighten the nut of the car wheel. To avoid time wasting and a lot of sources used to change the tyre, a special Hand operated tool is designed and fabricated to allow driver or machine to open nuts of wheel at a time with less energy.

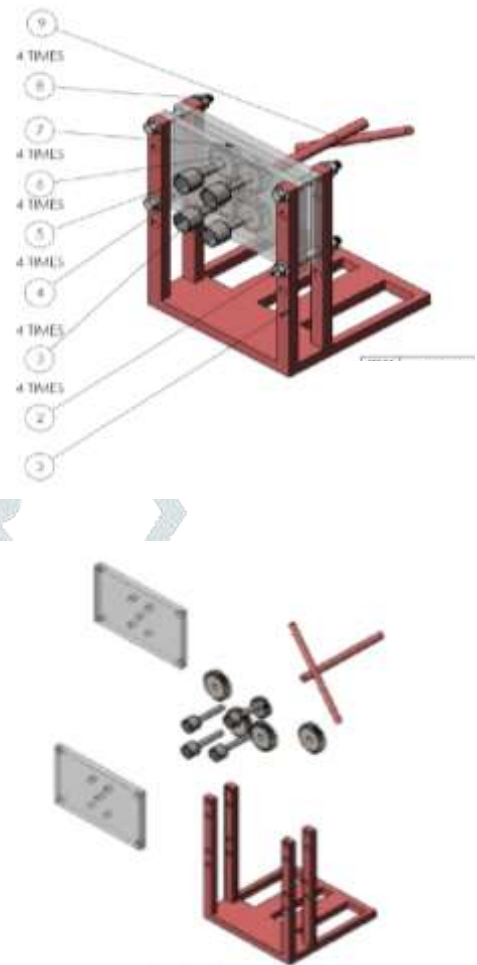
The design is based on standard PCD of 100 mm for most of cars available. In this figure the nut removal steps, tools needed, basic gear theory, spur gear terminology, standard gear calculation, standard spur gear tooth, and material specification will be shown. This information has collected from books and market survey. An automobile is one of the most basic and fascinating that one could own. Vehicles have now become a need and it is not only the symbol of luxury anymore.

Car is an important machine in human daily life. Nowadays, all family has at least one car to make the transportation easy and faster. If the vehicle tires have some problem then the user must remove the tires and fix the problem. And for a car user, it's difficult to removing tire's nut especially for women users. The obstacles are time waste and force needed. In Malaysia automotive market there is no tool that is easy to use to removing the nuts. The time to open a car's tyre nut is too long and has waste the car user's time with utilization of high force at that is hard for women users. To resist the time waste and high force needed a tool have been designed to remove four tyre nuts in one time with force decrement.

Car is not a symbol of luxurious anymore. It is a need for every family. People need car due to several reasons. Some of them are, to get to a destination, to travel conveniently, to do daily job and to move things to a greater distance. The problem occurs the most during car operation is the problem with tyre puncture. The flattyre needed to be replaced with spare tyre. Therefore, drivers need to know basic knowledge of tyre replacement procedure if such problem occurs. In order to change the flat tyre, one requires minimal skills. Virtually every car has a tyre replacement tools such as the L-shaped nut remover and jack supplied by the manufacturer.

Literature review

In the paper of Vaibhav Chowki Adjustable Multi nut wheel opener is a special purpose tool made to open/close all the five nuts of a wheel in one time with less effort. Although various methods are used for opening nuts, they require a lot of effort to open a single nut. The main objective of work is to develop a single tool with multiple mechanisms, which can be made use during assembling and dismantling of wheels in automobiles. It can be successfully used as a standard tool irrespective of the model of the vehicle. Also it can be used in assembly line of automobiles, garages, workshops and service stations. In the paper of B. Sivakumar a gear or "gear wheel" is a rotating machine part having cut teeth, or cogs, which mesh with another toothed part in order to transmit power. Two or more gears working in tandem are called a transmission and produce mechanical advantages through a gear ratio and thus may be considered a simple machine. Gears are mostly used in the mechanical field for power transmission, this project report on stress analysis of spur gears. Spur gear made of cast iron which is use for high strength. In the paper of A. S. Udgave Multiple-spindle drilling machines are used for mass production, a great time saver where many pieces of jobs having many holes are to be drilled. Multi-spindle head machines are used in mechanical industry in order to increase the productivity of machining systems. The multiple spindle drilling machines is a production type of machine. It is used to drill two holes in a work piece



simultaneously, in one setting. The holes are drilled on number of work pieces with the same accuracy. So we adopt the basic design for over project

Scope and Objective

- It acts as a convenient and simple method for tyre replacement process thus It is more suitable in using this setup for tyre removal in every vehicles for reducing the time consumed and for reducing the man power wasted for the tyre replacement and to overcome the emergency situations.
- This tool can be operated by anyone of different ages from young people to old people as it is easy to use and light in weight
- The vehicles multi wheel nuts remover reduces the time in the normal process and also the man power used.

Aim of project

- This paper presents a method to design & construct a multi nut remover by using a lathe, grinding wheel, drilling machine, taps.
- The use of material will be reliable for the better result.
- In order to make it more simple and to easy to machining the parts.
- Construction and mechanism is simple therefore mounting with wheel is easy.

Results and Discussion

Discussion

We discuss on a existing wheel nuts remover which is a normal L wrench and nut spanners are really inconvenient and difficult to use. It can remove only a single nut at a time and it requires man power for removing and tightening of the nuts.

Thus for old and weak peoples, the replacement of the tyre by this normal method is really inconvenient and difficult process. Not only for old people there are many examples like medical emergencies, job and everyone in this world is really busy and in rush all the time.

So in these cases where time is valuable this normal method becomes really inconvenient. Therefore, to overcome these problems we designed vehicles multi wheel nuts remover and tightener. This tool can be operated by anyone easily and it removes all the four nuts in a single process. Thus our projects saves time and man power and help everyone in their emergencies.

Results

Every car manufacturer provides tools such as L wrench and jack but easy and fast removal of nuts using these tools requires a skilled person. But vehicle all wheels nut remover and tightener allows driver to remove all nuts at once with less energy consumption and save time. In case of emergency puncture in the tires of the ambulance, it will be a time consuming process for removal of nuts. In those cases, it will be more useful in vehicle multi wheel nuts remover. The vehicle multi wheel nut remover and tightener remove all the nuts by torque. The wheel will be replaced by low consumption of time.

The fabrication of all wheel nut removers tool was completed by milling, welding and fitting process. So this design helps to avoid time wasting and a lot of energy used to change the tyre, it allows driver or mechanic to remove four wheel nuts at once with little energy consumption.

Conclusion

Thus the design and fabrication of vehicle all wheels nut remover and tightener is successfully done. This project is practically implemented in a four wheeler and it found that the results are positive. The project is economical, and it sustains all the required feasibilities. Vehicles all wheels nut remover and tightener is a perfect tool for assembling and dismantling a wheel in a four wheeler.

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