



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 Issue: IV Month of publication: April 2022

DOI: <https://doi.org/10.22214/ijraset.2022.41152>

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Fabrication of Multi Spanner Fastener Mechanism

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Abstract: The fabrication of a two-way multi-nut tightener and remover is an incipient innovation concept. The main aim of our project is to fabricate the two-way implement which is the cumulation of two implements four nut remover and five nut remover. Nowadays most cars have five nuts and four nut wheels it is arduous to carry two implements and costly to buy both the implement. From our project, we can abbreviate the carrying load of two implements into one implement and withal the cost of buying two implements by buying the sing implement. It minimizes the manpower and equal torque is applied to the entire nut in the car wheel. It can be prosperously utilized as a standard implement provided with an incipient conveyance. Additionally, it can be utilized in the assembly line of automobiles, workshops, and accommodation stations.

Keywords: Ball Bearing, Gears, Spanner Socket, Base Plate, Shafts.

I. INTRODUCTION

Transformation is one of the consequential needs in day-to-day life, among which car utilization plays a consequential role. However, most of the time an individual faces quandary with tire punctures that requires its abstraction from the conveyance for supersession. This is done with the avail of a simple or standard cross wrench that is supplied by the car manufacturer. They are provided with heads having slots of different sizes to suit the type of nut to be handled. It is withal required to hoist the body of the car marginally above the ground utilizing a jack to enable free abstraction of the tire from the wheel. All the four nuts at the periphery of the wheel are to be abstracted piecemeal and re-fine-tuned. This makes the entire process laborious and time consuming

An automobile is kenned to be one of the most fundamental and fascinating things that a person could own. The car has now become essential and it is not only a symbol of luxury anymore. Car maintenance, for example, is one of the key factors in determining its life span. This includes rudimentary erudition of transmuting the cars tyer. But superseding transfixed tires has always been an arduous task for everyone who utilizes the car and other four-wheelers. Every car manufacturer provides an implement to abstract the tire such as an L wrench and Jack nut this implement is very arduous to utilize for abstracting tires and requires an adept person. This implementation is so time-consuming. In case of emergency puncture in the tires of the ambulance, it will be a time-consuming process to abstract nuts. In those cases, this project implementation will be most serviceable.

II. LITERATURE REVIEW

The main purport of utilizing gears is to transfer power from a source to an application. Moreover, the modern technology of gears in its current form ages back to only 100 years ago. Nevertheless, the oldest form of gear can be traced back to the fourth century B.C Greece. In addition, there is a plethora of application that involves gearing system in them such as robotics, automotive, and power transmission. moreover, there are variants of gears that can be used such as bevel gears, helical gears, and spur gears. in this project, the gears train that is being used is consisting of spur gears that are meshed in a way to achieve the aim of this project which is to design and manufacture an automotive tire transmuting mechanism. nut remover is the most widely utilized in the field of conveyance.

III. LIST OF MATERIALS

Sr. No	Name of Component	Type Of Material	Quantity
1	Ball Bearing	Mild Steel	5
2	Gears	Mild Steel	5
3	Spanner Socket	Steel	4
4	Base Plate	Cast Iron	1
5	Shafts	Mild Steel	5

A. Dimension of the Component

Bearings:

Type of Bearing = Ball Bearing

Diameter of Bearing = 16mm **Gears:**

Type of gears = Pinion and Spur Gear

Diameter of the Pinion Gear = 54mm

No. of Teeth on Pinion = 22 **Shaft:**

Shaft Type = Solid Shaft

Diameter of Shaft = 16mm

Length of Shaft = 230mm **Metal Plate:**

The shape of the Plate = Square.

Size of Plate = 300*300

The thickness of the Plate = 5mm **Socket:**

Size of Socket = 21mm

IV. METHODOLOGY

The working of the multi-spanner mechanism is simple and can be performed by anyone. It does not require any special adeptness to operate it just rudimentary cognizance about the setup is required for the operation. This works under the principle of abstracting the wheel nuts in less time by applying force by the hand. It consists of shafts, lever, ball bearings, gears, base plate, box spanner. The main objective of the work is to develop a single implement, which can be made utilization during the assembling and disassembling of wheels of automobiles. The main objective of this work is to develop a consummate mechanism in one assembly. This machine is operated by both hands, due to which the central gear rotates in the same direction as the handle and by this kineticism, the four output gears which are in mesh with the main gears rotate in the antithesis direction to the first. Five bearings are affixed at the centers of five gears to transmit free rotational kineticism and to give the exact position of the gears.

By determinately, the force is transmitted to the sockets at the terminus of the connecting rods, and thus the four nuts can be opened at once. Generally, spur gear and pinion gears are utilized for transmitting power between non-parallel intersecting shafts. The cam and cam adherent mechanism is utilized for making the project adjustable. For this purport, the radial cam is utilized because the adherent moves in the direction perpendicular to the cam axis. And spherical face adherent is utilized because the side thrust and wear are considerably low. The pinion gear is meshing with four auxiliary gears which are in turn connected to a gear whose axle contains the socket spanners at its end. The auxiliary gear is connected to a hollow shaft (main shaft) which is acting as a guide for the adherent. The order terminus of the adherent is connected to a bevel gear. A lock nut arrangement is provided for connecting the main shaft to the adherent at any desired position.

V. FUTURE SCOPE

The multi nut remover is fine-tuned to a certain model of the car so in further work, we will transmute the implement into an adjustable type that can be suited for any model of the car.

We will endeavor to truncate the cost of the model in further work.

The weight of the model is minute cumbersomely hefty so in the future, we will endeavor to minimize the weight of the model with different lightweight materials. Now operating energy of the model is mechanical energy so in the further step, we will endeavor to arrange the motor to rotate the implement.

VI. CONCLUSION

Thus, fabrication of multi-spanner fastener mechanism is prosperously done. This project is virtually implemented in a four-wheeler and it found that the result is positive. The project is economical, and it sustains all the required feasibilities. A multi-spanner fastener is an impeccable implement for assembling and dismantling a wheel in a four-wheeler.

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