

Design and Fabrication of Semi-Automatic Mechanical Wrench

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Abstract - The purpose of using wrenches are for tightening or loosening the nuts and bolts and the operational methods are by hand or pneumatics. Here we are supposed to introduce a new method of wrench which is nothing but a mechanical wrench. Here purpose of this wrench is same like tightening or loosening the nuts and bolts. but the operation carried in this are totally by means of mechanical operation. The difficulties by using conventional type of wrenches are, not portable to working sites, power supply is mandatory, more space is required, skilled labor is required and it cannot be operated by the individual person, which needs other person to assist, installation is tedious and risky, by resolving this kind of difficulties the newly introduced mechanical wrench is self-operated, easy to handle, easy to portable. Mainly this can be used for driven to tight or loose the bolts and nuts of vehicles at any instant without any assistance.

Key Words: IC engines and Gear boxes, box spanners, Wrist and Hand Torque.

INTRODUCTION

The Very Essence of Our Economic Life and Growth Is Dependent In A Great Part Upon The Continued Improvement Of Mechanical Field. To Aid These Fields, We Have Designed SEMI-AUTOMATIC MECHANICAL WRENCH Which Can Be Widely Used to Tighten or Loosen the Products Like Automobile Wheel, Engine Nuts and Other Automobile Components. Extreme Care Should Be There to Tighten or Loosen the Nuts at Different Layouts. The SEMI-AUTOMATIC MECHANICAL WRENCH Helps to Achieve Accurate and Identical Tightening Nuts Layouts in Mass Production. The History of Man's Effort Is to Make His Work Easier, Faster and More Productive, Probably Began When He Learned to Use Lever, The Inclined Plan and The Wheel. The Thinkers and Experimenters Such As GALILEO, NEWTON And PASCAL, Are Discovered Interesting Phenomena Many Years in Advance of Actual Practical Applications Of Their Theories.

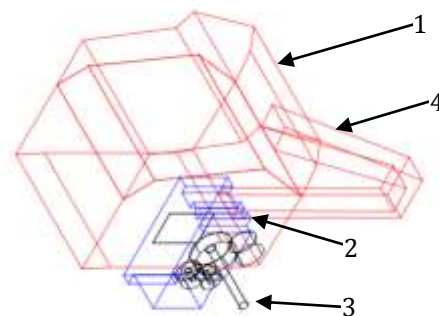
PRODUCT DEVELOPMENT PROCESS

This product " SEMI-AUTOMATIC MECHANICAL WRENCH" carried based on KARL .T. ULRICH'S product development process. [5]



Product development process

SYSTEM LEVEL AND COMPONENTS DESIGN



Cad design of Product

- 1- Engine
- 2- Gear box
- 3- Box spanner
- 4- Handle

WORKING PRINCIPLE

The experiment consists of the IC engine which is run by the fuel through the switches. The gear box run in the both the direction for the forward and the reverse direction of the tighten and the loosening motion. When the gear box runs in the forward direction, the portable mechanical wrench tightens the nut and removes if in the reverse direction.

A spindle head will tight or loose nuts simultaneously in a work piece.



Design of product

engine will not pollute the economy. It is economical and user friendly.



Emission test certificate

RESULT AND DISCUSSION

The product is produced, even considering the high material cost, it is easier to construct and less consumption of energy as compared to other fabrication materials, process, assembling, drilling, cutting and painting are simple. This machine loosen or tighten nuts and bolts within seconds.

FEATURES BETWEEN PNEUMATIC WRENCH AND MECHANICAL WRENCH

The product is produced, even considering the high material cost, it is easy to construct and less consumption of energy as compared to other fabrication materials, process, assembling, drilling, cutting, and painting are simple.

ADVANTAGES AND DISADVANTAGES

The semi-automatic mechanical wrenches main advantages are Easily transportable, Low cost, Less space required, No installation cost, Presetting for definite depth is possible prior to mounting on machine, Outputs shall be obtained at high precision, Time saving process and its disadvantages are This is used to for particular application, Power should be given from the fuel, Fuel cost is high, Lubrication required, Noise pollution, Air pollution

CONCLUSION

This Project Work Has Provided Us An Excellent Opportunity And Experience, To Use Our Limited Knowledge. We Gained A Lot Of Practical Knowledge Regarding, Planning, Purchasing, Assembling And Machining While Doing This Project Work. We Are Proud That We Have Completed The Work With The Limited Time Successfully. The “Designn And Fabrication Of Semi-Automatic Mechanical Wrench” Is Working With Satisfactory Conditions. We Are Able To Understand The Difficulties In Maintaining The Tolerances And Also Quality. The Chief Advantages Of Our System Are That, Simple Portable Type Low Coast Wrench When Compared To Other Wrenches Which Are Available In Market. Operating Principle Of Portable Mechanical Wrench Is Also Very Easy. We Have Done To Our Ability And Skill Making Maximum Use Of Available Facilities. In Conclusion Remarks Of Our Project Work. Thus, We Have Developed A “Portable Mechanical Wrench”. By Using More Techniques, They Can Be Modified And Developed According To The Applications.

SL NO	FEATURES	PNEUMATIC WRENCH	MECHANICAL WRENCH
1	Handling	Cannot move to the work site	Can be easily moved to the work place
2	Space required	2 meters required	0.5 meter required
3	Time required	Maximum 3 minutes required	Maximum 2 minute required
4	Power source	Pneumatic power	Mechanical power
5	Weight	40 kg	7 kg
6	Coast of machine	Rs 25000	Rs 8500
7	Fuel used	Electricity	Petrol

Table-1: Features between Pneumatic Wrench and Mechanical Wrench

EMISSION TEST ANALYSIS

The below result shows the pollution test result of the two-stroke internal combustion engine which we used in the semi-automatic mechanical wrench. The result is positive and economical. By this test we can understand that, this

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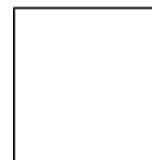
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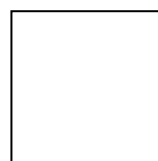
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