

Modification Of Motorize car jack

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ABSTRACT

In This Paper, We Modify An Manual Car Jack. The purpose of this project is to design an motorize screw jack which is easy for operating, safe and able to lift and lowering the car without spending much effort. Available car jacks are typically manually operated and therefore require more physical effort on the part of the user. Such jacks create difficulties for the elderly, handicapped, and women. Disadvantageous in bad weather conditions. And this is a waste of time and even will endanger if jacking and changing the tire is in hurry. So, for that reason electrical-powered jacks not only remove the task of lifting an Automobile via manually operated jacks, but also decrease the time needed to repair the automobile. This is a review of one type of automation project.

Keywords – Toggle switch, Motorize Car Jack, Reduction chain drive.

INTRODUCTION

A Screw jack is a device which is used to raise part of a vehicle in order to facilitate vehicle maintenances or breakdown repairs. In normal Jack system a mechanical jack is used for lifting the vehicles. The most common form is a car jack, garage jack, floor jack which lifts vehicles so that maintenance can be performed. Car jacks generally used to increase mechanical advantage while lifting the vehicle. In general, the weight of the vehicle is near about the 1 ton. A specified jack can hold up to 1000 kilograms, but tests taken by Consumer Affairs has revealed that it fails to work after lifting 250 kilograms and may physically break when it has a weight close to its 1000 kilograms' capacity. Tests have proven that the jack has the tendency to buckle under the weight it is promoted to withstand. For this reason, we have to developed the system which can used with toggle jack is motorize in operation. That means with the help of the electric motor. For this motor we have to use the vehicle battery is as source. In this, vehicle battery should be a 12V DC motor with some torque which is required to overcome the thread friction and to raise the load.

Mechanical machine toggle jacks are available from the standard range in capacities from 5kN to1000kN (Metric) and 0.25 – 250 tons (imperial). Standard classic and symmetric toggle jack configurations include upright or inverted translating toggle units with top plate, clevis or threaded end on lifting toggle and the option of keyed lifting toggle or anti-backlash feature, and upright or inverted rotating toggle with flanged lifting nut.

Machine toggle jacks offer positive mechanical actuation, precise positioning and uniform lifting speeds and can be used to push, pull or position loads, apply pressure or as linear actuators.

Standard machine toggle jacks offer you the combination of design flexibility and economy, with a standard model available for almost any requirement.

1. LITERATURE SURVEY

Screw type mechanical jacks were very common for jeeps and trucks of World War II vintage. For example, the World War II jeeps (Willys MB and Ford GPW) were issued the "Jack, Automobile, Screw type, Capacity 1 1/2 ton", Ordnance part number 41-J-66. This jacks, and similar jacks for trucks, were activated by using the lug wrench as a handle for the jack's ratchet action to of the jack. The 41-J-66 jack was carried in the jeep's tool compartment. Screw type jack's continued in use for small capacity requirements due to low cost of production raise or lower it. A control tab is marked up/down and its position

determines the direction of movement and almost no maintenance. Nitinchandra et al.[2], the study related to the toggle jack design, testing and result obtained with different materials. It was found that the toggle is compact and easy to use as compared to the other jack that are available in the market. In this toggle jack it was found that the distribution of load is symmetric and uniform. The Toggle jack reduce the force required for lifting the vehicle in order to change tire or minor repair. The toggle jack design is simple and consist of the eight main components I.e. the four parts are power screw driven and other four parts are for loading conditions. Here the unique design of the toggle jack been introduced to lift heavy loads at the stable state with the unique conditions. The main parts of the toggle jack are screw and nut, the screw is the moving part and the nut is the stationary part. The materials of the screw and nut were been checked for different materials and loading conditions from 1kN to 5kN, it was found that the alloy steel for screw and phosphorus bronze for nut was the best suitable combination.

2. CAD DRAWING

Procedure

- The entire model has been designed with the help of designing software solid works.
- With the help of colour feature the colours are given to the entire model.
- Figure- Cad model of the assembled project is designed on Solid works 2018 software

Solid Modeling

The entire model has been designed with the help of designing software solid works.

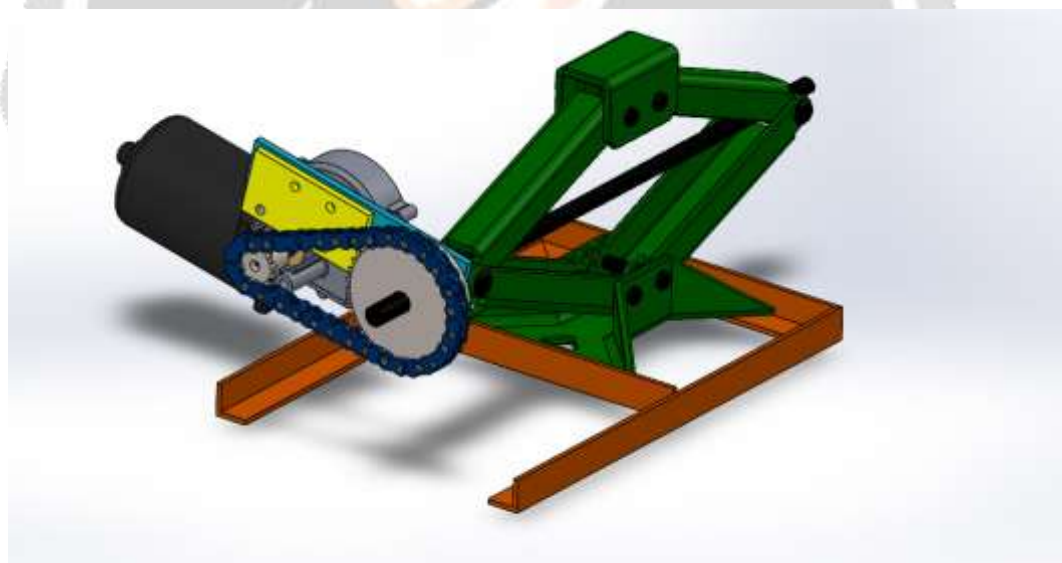
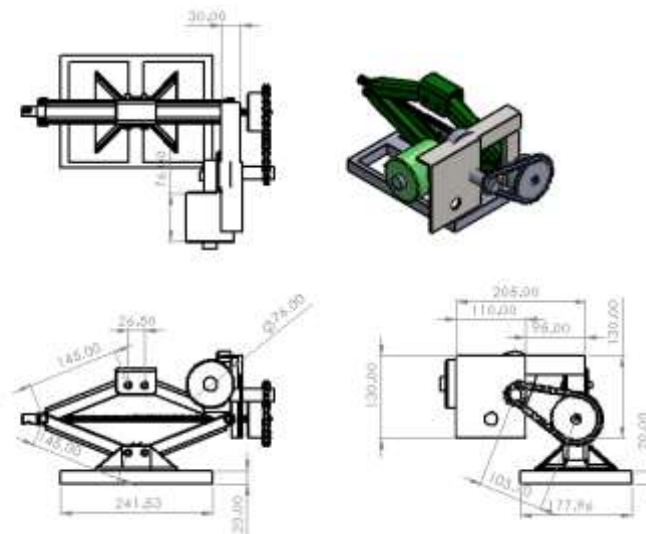


Fig .1



3. PROBLEM STATEMENT

Available jacks present difficulties for the elderly, women and are especially disadvantageous under adverse weather conditions. These presently available jacks further require the operator to remain in prolonged bent or squatting position to operate the jack.

Doing work in a bent or squatting position for a period of time is not ergonomic to human body. It will give back problem in due of time. Moreover, the safety features are also not enough for operator to operate the present jack. Present car jack does not have a lock or extra beam to withstand the massive load of the car. This is for the safety precaution in case if the screw break.

Furthermore, available jacks are typically large, heavy and also difficult to store, transport, carry or move into the proper position under an automobile. Suppose car jacks must be easy to use for pregnant women or whoever had problem with the tire in the middle of nowhere.

The purpose of this project is to encounter these problems. An electric car jack which has a frame type of design by using electric from the car lighter will be developed. Operator only needs to press the button from the controller without working in a bent or squatting position for a long period of time to change the tire.

4. WORKING METHODOLOGY

The button geared worm-gear jack is mostly used for automobiles. Hence, we have used the worm and worm gear box motor to construct the Button operated jack assembly. It consists of single jacks can be placed on any on the four wheels. A jack is placed on the rear axle or at the front side there not being the axle we are directly placing on the chassis body. To operate this jack system jack following procedure is followed. The jacking mechanism is used in the following way:

A. To Raise the Car Wheel

- This jack can be taken beneath the wheel side which is to be raised using worm geared gear box with chain drive and nut and lead toggle assembly separately.
- Use toggle switch provided on forward side for lifting up the vehicle

B. TO LOWER DOWN THE JACK

- Rotate the motor in reverse direction using speed reversal switch raising the jacking lead toggle arm to the upright position.
- Use toggle switch provided on backward side for lower down the vehicle

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