

# Design and Fabrication of Solor Power Motorised Jack

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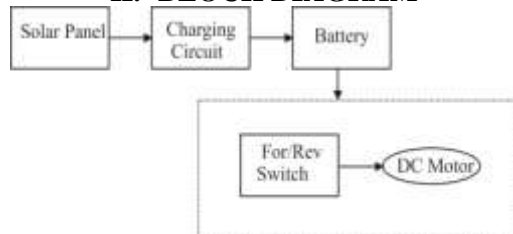
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## I. SYNOPSIS

Here we are introducing the motorized screw jack working with help of solar power. The vehicle should be lifted for certain type of works. This cannot be done manually. To avoid such problem a jack was invented. To make the work easier than a screw jack we have introduced a new concept called solar operated motorized jack operating through solar battery and ON/OFF switch by having full control of the jack, we can easily lift it up and down by using the on/off. This helps to reduce the burden of the worker. This project is designed by following blocks, Solar panel, Charging Circuit, Battery, Jack model, DC motor, and On / Off switch.

## II. BLOCK DIAGRAM



## III. INTRODUCTION

Jack is a mechanical device used to lift heavy loads or apply great forces. Available jacks present difficulties for the elderly people and women and are especially disadvantageous under adverse weather conditions. Presently available jacks further require the operator to remain in prolonged bent or squatting position to operate the jack which is not ergonomic to human body. It will give physical problems in course of time. Moreover, the safety features are also not enough

for operator to operate the present jack. Furthermore, available jacks are typically large, heavy and also difficult to store, transport, carry or move into the proper position under an automobile. The purpose of this project is to overcome these problems. An electric car jack which has a frame type of design by using electricity from the car 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.

## IV. OBJECTIVE

- To design a power scissor jack which is safe and reliable to raise and lower the load easily.
- Use of double start square thread in power screw.
- To fabricate the prototype of a scissor jack.
- To achieve mass production
- To reduce the production cost and time.
- To achieve good product quality.

## V. RESEARCH LITERATURE

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) issued the "Jack, Automobile, Screw type, Capacity 1 1/2 ton", Ordinance part number 41-J-66. These jacks, and similar jacks for trucks, were activated by using the lug wrench as a handle for the ratchet action to the jack. The 41-J-66 jack was carried in the jeep's tool compartment. Screw type jacks continued in use for small capacity requirements due to low cost of production to raise or lower the load. A control tab is marked up/down and its position determines the direction of movement and with no maintenance. The virtues of using a screw as a machine element,

which is essentially an inclined plane wound round a cylinder, was first demonstrated by Archimedes in 200BC with his device used for pumping water. There is evidence of the use of screws in the Ancient Roman world but it was the great Leonardo da Vinci, in the late 1400s, who first demonstrated the use of a screw jack for lifting loads. Leonardo's design used a threaded worm gear, supported on bearings, rotated by the turning of a worm shaft to drive a lifting screw to move the load. People were not sure of the intended application of his invention, but it seems to have been relegated to the history books, along with the helicopter and tank, for almost four centuries. It is not until the late 1800s that people have evidence of the product being developed further [3]. With the industrial revolution of the late 18th and 19th centuries, came the first use of screws in machine tools, via English inventors such as John Wilkinson and Henry Maudsley. The most notable inventor in mechanical engineering from the early 1800s was undoubtedly the mechanical genius Joseph Whitworth, who recognized the need for precision as important in industry. While he would eventually have over 50 British patents with titles ranging from knitting machines to rifles, it was Whitworth's work on screw cutting machines, accurate measuring instruments and standards covering the angle and pitch of screw threads that would most influence our industry today. 3 Whitworth's tools have become internationally famous for their precision and quality and dominated the market from the 1850s. Inspired young engineers began to put Whitworth's machine tools to new uses. During the early 1880s in Coati cook, a small town near Quebec, a 24- year-old inventor named Frank Henry Sleeper designed a lifting jack. Like da Vinci's jack, it was a technological innovation because it was based on the principle of the ball bearing for supporting a load and transferred rotary motion, through gearing and a screw, into linear motion for moving the load. The device was efficient, reliable and easy to operate. It was used in the construction of bridges, but mostly by the railroad industry, where it was able to lift locomotives and railway cars. Arthur Osmore Norton, spotted the potential for Sleeper's design and in 1886 hired the young man and purchased the patent and then Norton jack was born. Over the coming years the famous Norton jacks were manufactured at plants in Boston, Coati cook and Moline, Illinois. Meanwhile, in

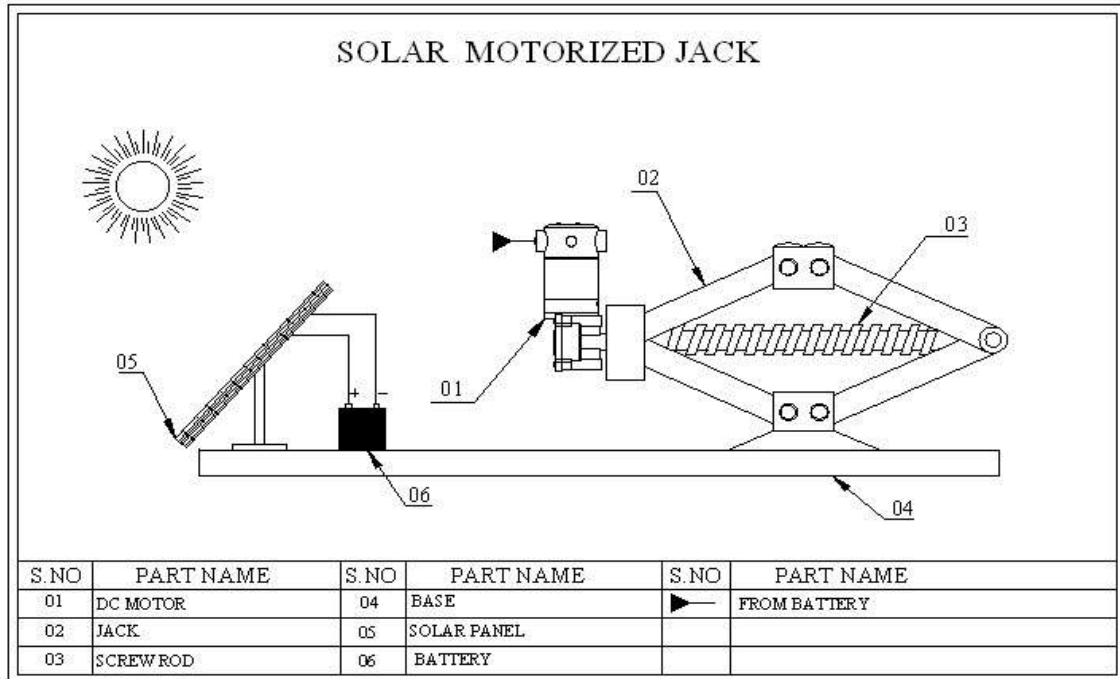
Alleghany County near Pittsburgh in 1883, an enterprising Mississippi river boat captain named Josiah Barrett had an idea for a ratchet jack that would pull barges together to form a tow. The idea was based on the familiar lever and fulcrum principle and he needed someone to manufacture it. That person was Samuel Duff, proprietor of a machine shop. Together, they created the Duff Manufacturing Company, which by 1890 had developed new applications for the original Barrett Jack and extended the product line to seven models in varying capacities [10]. Over the next 30 years the Duff Manufacturing Company became the largest manufacturer of lifting jacks in the world, developing many new types of jack for various applications including its own version of the ball bearing screw jack. It was only natural that in 1928, The Duff Manufacturing Company Inc. merged with A.O. Norton to create the Duff-Norton Manufacturing Company. Both companies had offered manually operated screw jacks but the first new product manufactured under the joint venture was the air motor-operated power jack that appeared in 1929. With the aid of the relatively new portable compressor technology, users now could move and position loads without manual effort. The jack, used predominantly in the railway industry, incorporated an air motor manufactured by The Chicago Pneumatic Tool Company. 4 There was a clear potential for using this technology for other applications and only 10 years later, in 1940, the first worm gear screw jack, that is instantly recognizable today, was offered by Duff-Norton, for adjusting the heights of truck loading platforms and mill tables. With the ability to be used individually or linked mechanically and driven by either air or electric motors or even manually, the first model had a lifting capacity of 10 tons with raises of 2" or 4"

#### **SOLAR PANEL**

The term solar panel is used colloquially for a photo-voltaic (PV) module.

A PV module is an assembly of photo-voltaic cells mounted in a framework for installation. Photo-voltaic cells use sunlight as a source of energy and generate direct current electricity. A collection of PV modules is called a PV Panel, and a system of Panels is an Array. Arrays of a photovoltaic system supply solar electricity to electrical equipment.

## VI. DESIGN AND DRAWING



## VII. WORKING PRINCIPLE

The solar panel is solar photovoltaic modules use solar cells to convert light from the sun into electricity. Now-a-days, instead of using the power from the supply line of vehicle battery for various operations, most of them are going for solar energy source, as it is cheapest. They trap the solar energy and they are using it for several applications. One such type of application is solar based motorized jack control system. The motor is connected to a lead screw system which lifts the jack in the upward direction. This is the cheapest method rod is fixed with the dc motor. The motor has a switch to control the direction of the rotation of the motor. The forward button is used to run rotates in reverse direction the jack moves downward. Using this equipment we can easily lift the load for various purposes. By altering the motor with higher torque the jack can lift heavy loads. and moreover we are attaining our desired target.

## VIII. CONCLUSION

The motor in forward direction and the reverse button is used to run the motor in the reverse direction. When the motor rotates in forward direction the jack moves upwards so that the vehicle or an object can be lifted. When the motor This project is made with pre planning, that it provides flexibility in operation. This innovation has made the more desirable and economical. This project "SOLAR MOTORIZED

JACK" is designed with the hope that it is very much economical and help full to small scale industries and lathe shops.

This project helped us to know the periodic steps in completing a project work. Thus we have completed the project successfully.

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