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Motorized Scissor Jack

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Abstract: *A scissor jack or a Jackscrew is operated by the rotating motion of a lead screw. The height of the jack is acclimated by turning the lead screw. This can be done either manually or by installing an electric motor in a scissor jack attached to a lead screw. This integration is our design. The delicate part of the design may be changing a low-speed motor that's suitable to work at 12V. This is because the battery required for a machine is 12V, and the electricity demand for the operation of the scissor jack is taken from this battery. Another problem will be regarding speed reduction. principally, 12V motors generally operate at advanced pets, probably at 4000 or 5300 rpm. So, reducing the rpm to the needed lower rpm for the operation of a scissor jack without big accessories or power loss can be grueling. With this design royal homemade work can be achievedfluently. This can be done in any type of jack like spherical screw jack, bottle screw jack, and scissorscrew jack. In our design, we use a scissor screw jack which is motorized.*

Keywords: Scissor Jack, D.C Motor, Automation

I. INTRODUCTION

An electrically operated screw- type jack comprising a support base, a casing, a jack body, a lifting ram which is contained in the jack body, a servo motor which is contained in the casing, reduction gears for transmitting the driving power of the servo motor to the lifting ram, a safety device help themotor and the power transmitting medium from an abrupt Failure due to overfilling, a square head leg for conventional hand operation of the jack when the jack is overfilled. The safety device consistsof a clutch fragment, a clutch spring, and a sleeve. The reduction gears correspond of the first sun and earth gears, alternate sun and earth gears and a sun gear cylinder. The remote is used for controlling the jack from distance. In case of heavy objects, the jack can be operated for ever. No need to control manually, this design reduces accidents. Hence, irrespective of its size and weight a jack that is used to lift the vehicle is one of the most essential accessories that need to be constantly kept close at hand. Thus, the need to keep the jackavailable is undeniable. These days several types of either manually operated or automatic jacks whether lightweight/portable or heavy are widely used to fulfil their purposes in lifting heavy as wellas light equipment's.

II. WORKING PRINCIPLE

A screw jack or a Jackscrew is operated by turning a lead screw. The height of the jack is acclimatedby turning the lead screw. This can be done either manually or by integrating an electric motor with it. This integration is our design. Power screws are used to convert rotary. stir into translatory stir. A screw jack is an illustration of a power screw in which a small force applied in a vertical airplane.

It is used to raise or lower a large cargo. The principle on which it works is like that of an inclinedairplane.

The mechanical advantage of a screw jack is the rate of the cargo applied to the trouble applied. The screw jack is operated by turning a lead screw. The trouble needed to rotate the screw can be excluded by using a 12V DC motor to rotate the screw of the jack, which facilitates in easy relief of tyre. The advantage of this system is that it draws the energy from the vehicle's battery. For necklaceaddition, generated by the motor two spur gear are used. A small gear is mounted on the motor shaftand a large spur gear on the power screw of the jack.

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APPLICATIONS:

- The jack can be operated remotely.
- Can be used by physically handicapped persons to lift car or other things.
- Can be used in workshops or for personal use.

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.
- Pins in bearings.
- To fabricate the prototype of a scissor jack.
- To achieve mass production.
- To reduce the production cost and time.

III. BLOCK DIAGRAM

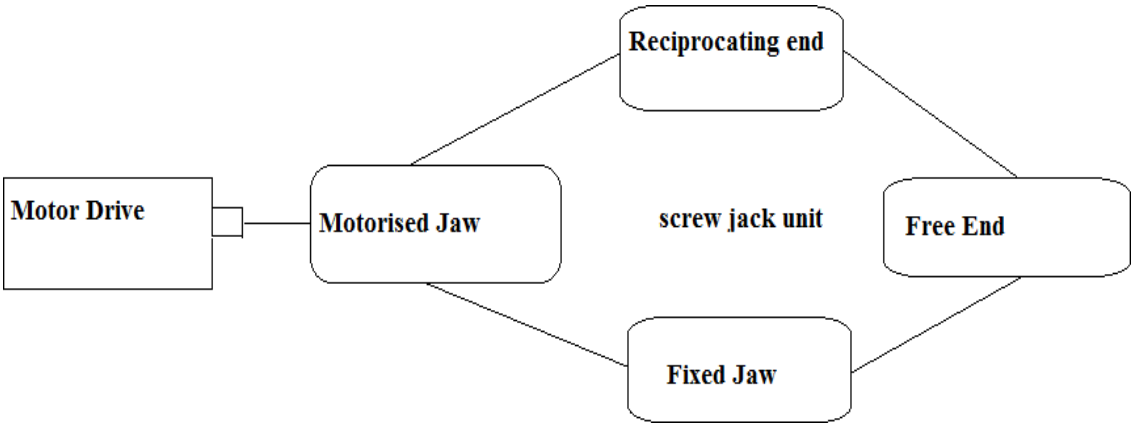
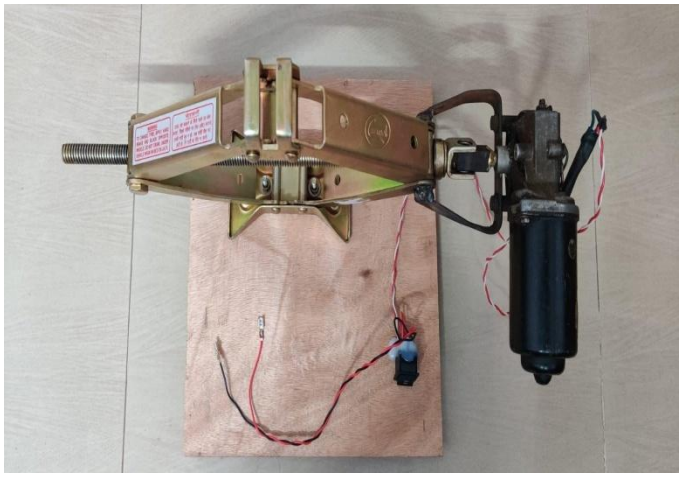


Fig.1: Motorized scissor jack

IV. CONSTRUCTION

When the motor starts rotating then along with the motor the lead screw also starts rotating. This design also comes with a" Safety Nut". When a screw jack unit is operated, the rotation of the worm shaft causes the worm gear to rotate. For rotating screw jacks the lead screw is fixed to the worm gear and they rotate at the same speed. As the worm gear turns, the nut alsorotates connected to a lead screw.



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DEVELOPMENT OF MOTORIZED SCISSOR JACK

For overcoming the conventional scissor jack failures develop the motorized scissor jack which consists of following components.

- D.C Gear Motor
- Scissor Jack
- Battery
- Switch

These are the important components required for construction of Motorized scissor jack.

No.	Components	Power Output	Uses
1.	Battery	12 Volts	To supply power to dc motor
2.	DC Motor	1000 r.p.m	Used to rotate the lead screw
3.	Scissor Jack	It can lift 1500 kgs by adjusting the height of the jack	It is used to lift heavy weights in industries, garages
4.	switch	We can rotation of motor	It is used to operate the machine

Table 1. Components & Uses

HARDWARE USED IN PROJECT:

- Scissor Jack
- Mounting Base
- Threaded Screw
- Base Plate
- Bearing
- Coupling
- Movable Joints
- Steel Plates for Supporting
- Welding Electrodes
- Motor
- Power Supply
- Switch
- Hardwares to Fit

TOOLS USED IN PROJECT:

- Welding Machine
- Screwdriver
- Spanner
- Soldering Rod
- Soldering flux

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V. PROPOSED DESIGN – MODEL OF MOTORIZED SCISSORJACK:

VI. CONCLUSION

Scissor Jacks are the best product to lift and lower the weights from a couple of kilograms to hundredsof tons. The need has long been for a bettered movable jack for automotive vehicles. It's largely desirable that a jack comes available that can be operated alternately from inside the vehicle or from a position of safety off the road on which the vehicle is located. Such a jack should preferably be light enough and compact enough so that it can be stored in a machine box, can be lifted, and carried by utmost grown-ups to its position of use, and yet be able of lifting a wheel of a 4,000 -5,000-pound vehicle off the ground. Further, it should be stable and fluently controllable by a switch so that jackingcan be done from a position of safety. It should be fluently portable either to a position underneath theaxle of the vehicle or some other corroborated support face designed to be engaged by a jack.

Therefore, the product has been developed considering all the below conditions. This design of the motorized scissor jack will prove to be salutary in lifting and lowering loads.

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