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DESIGN AND FABRICATION OF REMOTE OPERATED SCISSOR JACK

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ABSTRACT

Scissor jacks are simple in construction and easy to used to run large loads for short distances. The power mechanism of screw design of a common jack reduces the force to drive the mechanism. Scissor jacks are easy in design consisting of the member driven by a screw. The work in this study is design & fabrication of, and remote operated scissor jack. A scissor jack, remote operated by switch buttons consists of a motor, four arms, a load engaging head and stabilizer base. The lifting mechanism occur with the help of motor. When the car required to be lift at a height press the switch and release the switch at the required height below or above ground. The developed automatic car jack is based on the result and analysis part to lift loaded car, van

KEYWORDS: Electric Tri-Wheel, Scooter, Transportation, Individualized Transport Systems, Electric Vehicles, Car.

I. INTRODUCTION

A jack is a portable device consisting of a screw mechanism used to **up or down** the load. The working principle of the jack is like to that of an inclined surface. There are two categories of jack one is scissor and another is mechanical. Scissor jack consists of a cylinder and piston and The moving of the piston rod is help to raise or lower the load. Mechanical jacks are hand operated or power driven.

Objectives:

The purpose of this work is as follows:

1) To design a remote operated scissor jack ,
2) To fabricate a prototype of a scissor jack,
3) To test for reliability of the designed and fabricated a scissor jack.

Scope Of Study

It's therefore obvious that Lifting technology really didn't emerge until the start of the Industrial Revolution in approximately 1812. Incremental stages that increased production of Steam Engines, by the Combustion Engine.

II. METHODOLOGY

The scissor jack design consists of four main lifting members, four connection members, a power screw and a crank. Members 1 through 8 are all primarily c-shapes with ideal pin connections. Members 1 and 5 both have additional details to account for the contact surfaces. The power screw is single threaded with a collar at the member 3connection. The following is a summary of the design features for our proposed SCISSOR jack.

Main Lifting Members: These members are made from simple c-shapes. The web of the members is cut out near the pin connections to allow proper serviceability of the scissor jack at its maximum and minimum heights. Members 4 and 6 have ideal gear connections to balance the load between the left and right side

Sleeve Members: The sleeve channels are to open inwards. This is so the flanges are subjected to tension instead of compression. The bending moment from the power screw creates tension on the inner edge of the sleeve and compression on the outside edge. Tension along flanges on the inside prevents the possibility of localized buckling in the flanges from compressive forces. for reasonable power screw diameters

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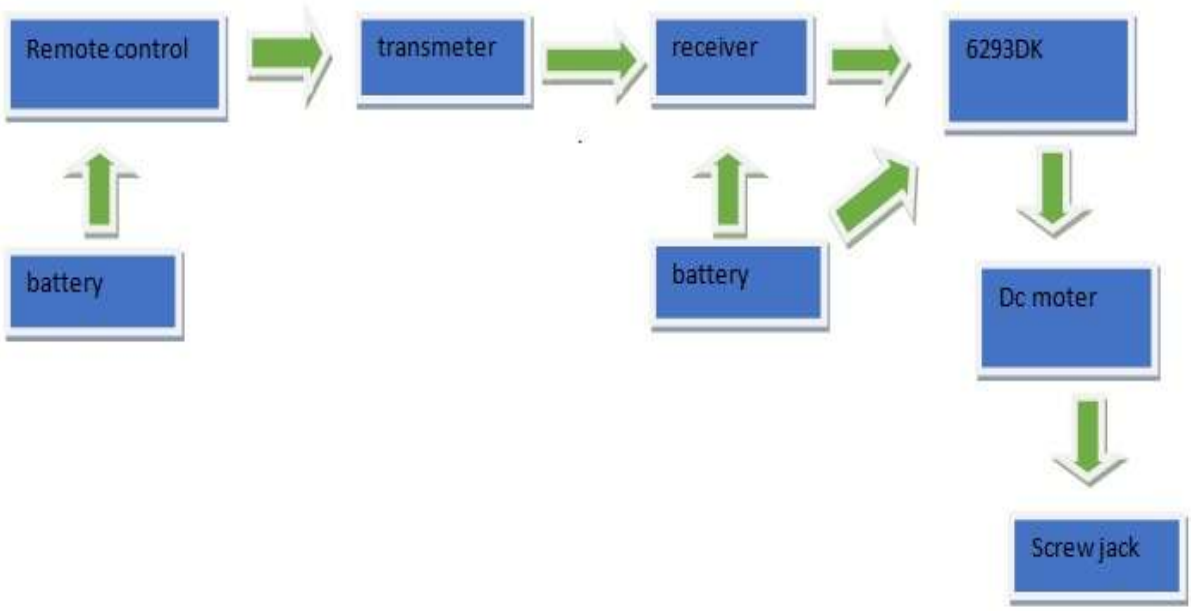
III. WORKING OF THE PROJECT

Working of the Remote Controlled Screw Jack:



Block diagram of remote operated screw jack

IV. MODELING AND ANALYSIS

Fig-1: Remote Operated Scissor Jack

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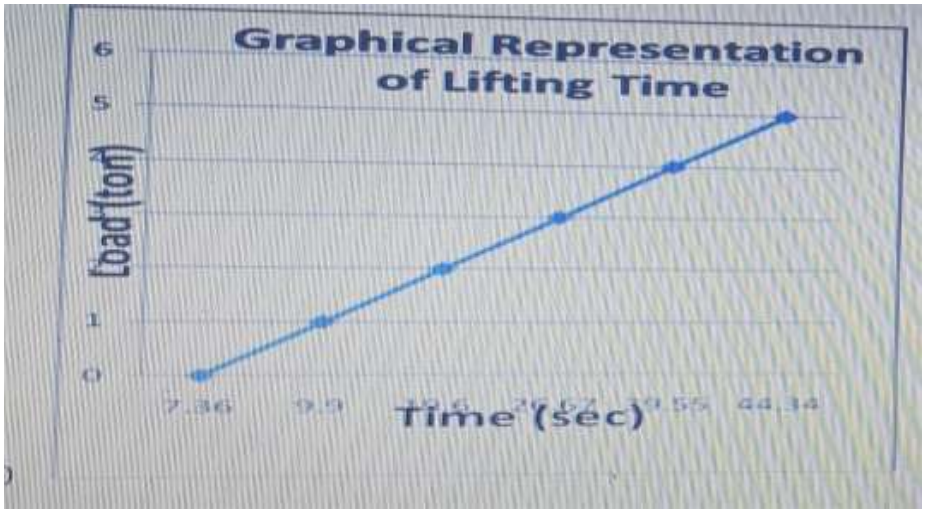
V. RESULTS AND DISCUSSION

1. Result

Table -1: Shows the result of the lifting operation obtained at varying loads with different time intervals

S. No	Load(Tonns)	Time Of Lifting
1	0	7.30
2	1.0	9.70
3	2.0	19.20
4	3.0	26.17
5	4.0	40.10
6	5.0	44.11

Results timing device lagging or leading



2. Discussion

It was observed that at no load condition the device performed with minimum time, subsequently varying loads of (1 ton – 5 ton) was introduced at a lifting speed of 2650rpm which reduces as the hydraulic piston comes in contact with the load, the loads were lifted with ease showing that the loads lifted are within the capacity range for which the device can lift. The varying loads of 1 ton and 2 ton were lifted up to a regulated height as desired depending on the required space for the underneath equipment maintenance to be carried out. When lifting the loads of 3 ton, 4 ton and 5 ton respectively it was observed that the increase in the time of lifting indicated an addition of extra load. The sizes of the lifted loads were determined as specified by the equipment manufacturer. Testing the device with varying loads indicated its behavior and response to varying loads.

VI. CONCLUSION

In this section, the important terminologies in this proposed method are presented-

a) Jack A mechanical jack is a device which lifts heavy equipment. The most common form is a car jack, floor jack or garage jack which lifts vehicles so that maintenance can be performed [6]. Car jacks usually use mechanical advantage to allow a human to lift a vehicle. More powerful jacks use mechanical power to provide more lift over greater distances. Mechanical jacks are usually rated for a maximum lifting capacity (for example, 1 tons or 2 tons).

b) Scissor jack A scissor jack is a simple and effective tool used to elevate vehicles, stabilize trailers, and lift a variety of heavy items with little physical effort. A scissor-jack is a type of platform which usually only does work in one plane. The scissor jack shown in figure 1 lifts against the vehicle weight in the vertical direction. If oriented vertically, the scissor jack would move up and down in the vertical plane.

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