

(Design and Manufacturing automatic Electro-Hydraulic Jack For Light Vehicle)

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Abstract

A jack is a mechanical lifting device used to apply great forces or lift heavy loads. A mechanical jack employs a screw thread for lifting heavy equipment. A hydraulic jack uses hydraulic power. In the case of tyre puncture or replacing wheels lift the car is more important part. This time we use traditional ways to lift the tyre. In that case a physically handicapped person, older person aged person not lifts the tyre easily. They require more time and also require more force to lift the tyre. In that way to help those who are physically challenged, aged person this project automatic hydraulic jack system is more useful. So, we tried to grab the opportunity. Here we use a wiper motor to drive the hydraulic jack loading subsequently and automatically.

Keywords: Hydraulic jack, Mechanical jack, Motor, Battery, Switch

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I. INTRODUCTION

The most common form is a car jack, floor jack or garage jack, which lifts vehicles so that maintenance can be performed. Jacks are usually rated for a maximum lifting capacity for example, 1.5 tons or 3 tons. Industrial jacks can be rated for many tons of load. Efforts have been made to include the latest possible trends in the field of hydraulics and allied control areas to keep the over changing state technology in hydraulics. In the case of tyre puncture or replacing wheels lift the car is more important part. This time we use traditional ways to lift the tyre. In that case a physically handicapped person, Unskilled person or aged person not lifts the tyre easily. They require more time and also require more force to lift the tyre. In that way to help those who are physically challenged, ladies or aged person this project automatic hydraulic jack system is more useful. So, we tried to grab the opportunity. Here we use wiper motor to drive the hydraulic jack loading subsequently and automatically. Our project works on the mechanism of converting rotary motion of the wiper motor into reciprocating motion of the hydraulic jack plunger. A cylinder cage structure of wiper motor ensures maximum power delivered by consuming the available battery power which can be easily generated. Important thing is that power is available at instant and anyone can withdraw easily, without any hazard. Battery is also available in any car so when our external battery will be discharge then we use power in the car.

1.1.1 Assembly

1) Hydraulic Jack: A Hydraulic jack consists of a cylinder and piston mechanism. The movement of piston rod is used to raise or

lower the load. And secondly Mechanical jacks. They are either hand operated or power driven. They have further components

like ram, plunger

2) Motor: The motor is DC type of motor with 12 volts power which gives 45rpm speed, which is efficient to lift the vehicles

from ground.

3) Crank: It can be used to convert circular motion into reciprocating motion, or vice versa. The arm may be a bent portion of the

shaft, or a separate arm or disk attached to it.

4) Connecting Rod: When crank combined with a connecting rod, it can be used to convert circular motion into reciprocating

Motion, or vice versa.

5) Battery: Acid lead battery with capacity 35A provides nominal Voltage of 12V

- 6) Switch: To operate the operation in one press switch is used to closed and open the circuit from battery with motor hence Jack will be stop.
- 7) LED Strip: For Better visualization and handling the operation during night time
- 8) Base Frame: All of the above components are assembled with this base to achieve the goal.

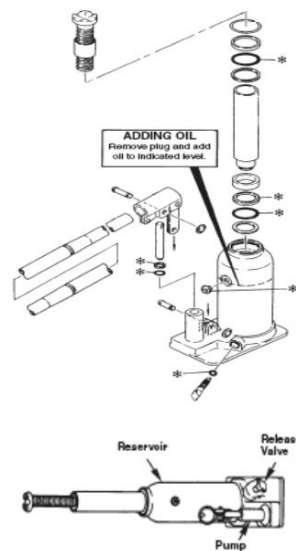


Fig. Hydraulic Jack

1.2 DESIGN OBJECTIVE

- 1) To increase simplicity of jack operation
- 2) To increase the capacity
- 3) It must be low in cost and commercially viable for all people.
- 4) Increasing the speed than regular speed
- 5) To get low maintenance
- 6) To avoid manual power for operating the jack. A sincere attempt is made to accomplish almost all objectives as mentioned above and make it practically feasible.

1.2.2 Material specifications

Table 1 represents the rerun column Material specification.

S. No	Component	Material	Reason/ purpose
1	Hydraulic Jack	Steel/Plastic/Rubber	To lift the vehicles
2	Crank	Mild Steel	Convert Rotational Force to Linear Force
3	Connecting rod	Mild steel	Connecting to jack with crank
4	Base Frame	Mild steel	Work as Stand

II. RESULT AND DISCUSSION

The results obtained are as discussed below

Sere no.	Car Name	Car Weight (KG)	Lifting Time (Sec)	Length
1	Renault kwid	775	23.00	120
2	Maruti Suzuki Omni	800	24.00	120
3	Maruti Alto 800	850	26.00	120
4	Wagonr	905	28.00	120
5	Maruti Suzuki Swift	955	28.00	120
6	Baleno	960	30.00	120
7	Hyundai Santro	995	32.00	120

III. CONCLUSION

Here we conclude that we completed the project named "Design and Manufacturing of electro-hydraulic jack for light vehicle

It should be easily movable either to a position underneath the axle of the vehicle or some other reinforced support surface designed to be engaged by a jack. Thus, the product has been developed considering all the above requirements. This particular design of motorized automated object lifting jack will prove to be beneficial in lifting and lowering of heavy loads.

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