

Fabrication of Inbuilt Hydraulic Jack for Four Wheelers

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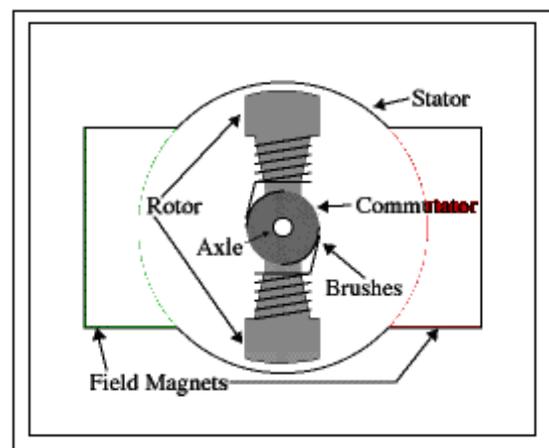
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Abstract - The main aim of our project is to manufacture a hydraulic lifting system which is used for lifting the four-wheelers. The main reason to fabricate this equipment is easy to handle the vehicle during puncture or some repairs made in critical situation without arranging the lifting arrangements externally. In our project, the hydraulic cylinder is fixed on the four sides of vehicle and so the vehicle can move up by just operating the hydraulic cylinder which is connected to the master cylinder. So we can easily make the lifting operation by this equipment. This equipment is suitable for all four wheeler vehicles. This project consist the following parts Hydraulic cylinder, screw rod, DC motor and gate valves.

proportional to the current in the conductor, and to the strength of the external magnetic field. A simple DC motor consists of stationary set of magnets, armature, commutator and carbon brushes. It is based on the principle of Fleming's left hand rule. DC motors are classified based on their excitation configuration as separately excited and self-excited.

Figure 1: Motor



1. INTRODUCTION

The Inbuilt Hydraulic Jack is the equipment which is used to lift the four-wheelers with the help of hydraulic cylinders, fluid (oil), and gate valves. The usage of this equipment drastically reduces human power and saves enormous time during the puncture of the tyres. The fluid used in the cylinder should be in-compressible, so that the equipment may withstand the weight of the vehicle. The components used and working of this equipment has been discussed in detail.

2. COMPONENT USED AND DESCRIPTION

- Screw rod
- DC Motor
- Hydraulic cylinder
- Gate valve
- Control unit

2.1 SCREW ROD

A lead screw also known as a power screw or translation screw is a screw designed to translate radial motion into linear motion. Common applications are machine slides, vices, presses, and jacks. Their efficiency is typically between 25 and 70%, with higher pitch screws tending to be more efficient.

2.2 DC MOTOR

The operation of a DC motor is based on simple electromagnetism. A current-carrying conductor is placed in an external magnetic field, it will experience a force

2.3 HYDRAULIC CYLINDER

A Hydraulic cylinder is one of the mechanical actuation system which is used to give either unidirectional or bi-directional force. Usually, the cylinders are actuated by means of hydraulic fluid. The fluid used should be incompressible. It consists of a cylinder barrel, in which a piston connected to a piston rod moves forward and backward. The hydraulic cylinder is classified into single acting and double acting cylinders.

2.4 GATE VALVE

Gate valve is a valve with sliding plate that controls the flow of the fluid in and out of the pipe. Gate valves are classified into parallel shaped and wedge shaped gate valves. They are designed for the purpose of on and off services. The major components are body, bonnet and trim. When the gate valve is opened, the flow path is increased in a highly non-linear manner.

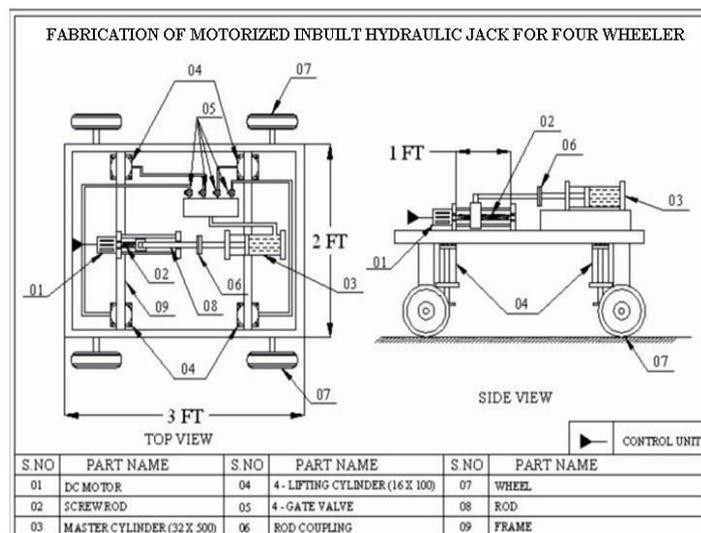
2.5 CONTROL UNIT

The control unit is a device which incorporates a microprocessor in it. The control unit has become one of the major building blocks of many intelligent systems. They find usage in diverse areas. It identifies the vital features responsible for their tremendous impact, the acute educational need created by them and provides a glimpse of the major application area. They are small in size, consume less power and are inexpensive. A microcontroller can perform operations on its own without any input ports and external memory storage system.

3. WORKING PRINCIPLE

The equipment consists of hydraulic cylinders, lead screw motor and gate valve. The rod from the motorized screw rod guide is connected to the master hydraulic cylinder. The four no. of hydraulic cylinders are fixed in the four corners of the vehicle. The master cylinder is connected to the other four cylinders. When the switch is ON, the motor pushes the rod in the screw rod, moving the master cylinder piston rod backward. Hydraulic oil in the master cylinder exits to a chamber from where hydraulic oil flows to each of the four cylinders through a hose. Then it supplies the oil to the lifting cylinders when the gate valve for each lifting cylinder is opened. If we need to operate a specific cylinder, we can operate the gate valve of that specific cylinder. After puncturing the wheel or after completing the mechanical fault in the vehicle, the wheels are grounded safely by the same process.

Figure 2: Detailed figure



4. CONCLUSION

The project carried out by us made an impressive task in the field of automobile department. It is very useful for lifting the vehicle with the help of a lead screw and DC motor set up. This project will reduce the cost involved in the concern. Project

has been designed to perform the entire requirement task at the shortest time available.

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