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DESIGN AND MANUFACTURING OF AUTOMATIC BLUETOOTH OPERATED BOTTLE HYDRAULIC JACK

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Abstract - The focus of this paper is to present a car lifting jack review of the automatic jack system that have been developed with primary focus on hydraulic motorized system. The paper includes a review of automobile car jack and design of automatic car jack. A description of the scientific significance of the work and the industrial implications arising from review study of automatic car jack is also presented. Automobile car jack is becoming prevalent in the automobile working industry for establishing the property which allow to apply less effort to lift heavy load. The primary reason for design of automatic jack is to reduce effort, as increase in efficiency of jack and design should be ergonomic, i.e. avoidance of complex posture and position of jack operator. As we found that generation of car jack is improve day by day, previously use of toggle jack is most widely for light commercial vehicle, screw jack for heavy vehicles. But now a day's use of hydraulic system and pneumatic system in car jack is increased. This system reduces effort to lift load. But the complex posture and position of operator while operation is remain same. Hence, Need to design a motorised car jack. But in case of failure of electronic system jack is not able to work manually. From literature study we found that, in hydraulic system bottled jack is more efficient than any other. The aforementioned reasons have led to research activity in the area of motorized jack which is operated by more than two way like, electronically as well as manually.

Key Words: Hydraulic, Motorised, Electronic, Bluetooth, Wifi, Manual.

1. INTRODUCTION

Roy etal.[1],detailed information about the very first jack which was been introduced in the automobile industry. The jack used earlier need much effort to lift the vehicle for changing the tire. But now the changing of the tires has been easy, due to the introduction of the new pneumatic jack. The working of that pneumatic jack was simple, the person just needs to connect the jack to the electrical driven compressor or compressor driven by engine doing so the jack use to get working the vehicle use to get lifted. The jack was stable and easy to operate. Inflation pressure for most standard-sized cars is in the range of 20-25 psig. The pneumatic jack was compact and so it can be stored within the spare wheel. Today's automobile offers limited space and uncertain lifting methods and so this offers the chassis engineer considerable freedom of choice.

Nitinchandra etal.[2], the study related to the toggle jack design, testing and result obtained with different materials. It was found that the toggle is compact and easy to use as compared to the other jack that are available in the market. In this toggle jack it was found that the distribution of load is symmetric and uniform. The Toggle jack reduce the force required for lifting the vehicle in order to change tire or minor repair. The toggle jack design is simple and consist of the eight main components I.e. the four parts are power screw driven and other four parts are for loading conditions. Here the unique design of the toggle jack been introduced to lift heavy loads at the stable state with the unique conditions. The main parts of the toggle jack are screw and nut, the screw is the moving part and the nut is the stationary part. The materials of the screw and nut were been checked for different materials and loading conditions from 1kN to 5kN, it was found that the alloy steel for screw and phosphorus bronze for nut was the most best suitable combination.

Sainath.etal.[3], the information about the basic jack along with the types of Jack's used in the automobile industry, the design procedure of mechanical hydraulic jack is also been studied. The classification of the jack is based on the forces employed, the mechanical jack includes car jack and house jack, the other is the hydraulic jack they are bottle jack and floor jack. After the proper study and research, it was found that the hydraulic jack is stronger and can lift the heavy loads at the height required. The hydraulic jack are the most efficient and reliable jack available in the market, they lift the vehicle with the less human effort and with the help of the pressure generated inside the cylinder and oil present inside the cylinder. The calculation are been done in order to get the proper dimension of the jack and make the jack more efficient than the earlier.

Pawar etal. [4], the design of a screw jack and its automation are been introduced. The jack operation was easy and less effort was required to lift the jack it was also much more reliable than the usual basic jack that are manually operated and were used earlier. Now the modification are been done in the screw jack made the operation automatic I.e the motorised screw jack was introduce in the automobile industry, the jack was compact and much more reliable. After several studies and researches the screw jack it was been found that the jack was easy to operate, reliable, easy to move and store due to desirable size.

Asonye etal. [5], the study is about the design and fabrication of hydraulic jack using remote controlled system and the jack is tested for its effectiveness by varying loads up to

5tons. The hydraulic jack available in the market are manually operated and required more efforts to lift the load. Taking into consideration the effort required for lifting the load which was not easy to operate the remote-controlled system for hydraulic jack was been introduced. This jack was remotely controlled so its was easy to operate as compared to the usual jack available in the market. The main components used were a 12V battery, DC Motor, Crank lever mechanism. The aim of making this jack was to reduce the effort required to lift the load and make its easy and simple for operation at any loads. The results obtained were very effective and it was found that the time required to lift was minimum depending upon the weight, this remote-controlled system jack was found reliable than the manual jack available in the market

Sudarsan etal. [6], they have designed a automatic hydraulic Jack. The motive of design this project is to provide a button to lift heavy load, because there are mechanical Jack's which is difficult to operate and requires more effort and also the Jack are to huge to carry, during the tire puncher in the ruler area, hilly regions, forest area etc. It is difficult to charge the tire with the mechanical Jack, so they have designed a automatic hydraulic Jack which is easy to operate and carry. The automatic Jack is operated by pressing a button which is mounted on a dashboard.

Masiwal etal. [7], they have designed a hydraulic Jack for four wheelers, the purpose of designing this project is to reduce the mechanical effort and it helps to save lots of time while repairing the puncher tire as compared to earlier method. It consists of main components like piston cylinders which is welded on the chassis of vehicle. When the driver presses the brake pedal the pressurized brake oil passes through non-retune valve and move to the piston, the piston cylinder which result in lifting, the puncher side of the vehicle

Jayapradha etal. [8],they have designed the hydraulic jack of self-jacking the main purpose of design is that the driver can operate inside the car itself and it also consumes less effect and time compared of mechanical Jack's. The hydraulic Jack are mounted on the frame and the motors are used to control the jack and it connected with the crankshaft and also the suspension springs are attached on the side, the 12v battery is provided to run the motor, the hydraulic Jack is operated by the help of button which is mounted on the dashboard. This project is easy to mount on chassis or frame and it's easy to servicing of vehicles. When the vehicle gets punctured this system is very helpful to replace the tires and no need to carry external Jack.

Sharvanan[9], lifting of Automobiles vehicle has used by built-in hydraulic jack it's consists of main parts like hydraulic cylinders, lead screw and solenoid valves. It's operated by pressing a button that has been provided on dashboard. The hydraulic jack is self-lubricated and fixed asset with a pump, which helps to a fluid to force into a cylinder. A vehicle is lifted by the help of lead screw and the DC motor. The main motive to design this project is to reduce the human efforts while lifting of a vehicle.

Kamalakkannan etal. [10], they have fabricated the manually operated screw Jack to a motorized screw jack to lift the heavy loads. The manually operated screw jack required more effort to lift the load compare to motorized screw Jack. The motorized screw Jack is easy to operate by pressing a given button to lift the loads, it is very useful in Automobile service centre to service a car. The main reason to design the motorized screw jack is to keep away from the tiredness of a human during lifting of the load. The cost of this project is less and its efficient to operate.

Barewar etal. [11], they have fabricated a screw jack to automatic. The screw jack is a device which is used to lift the heavy loads with the application of small force. The effort which is required to operate the screw jack is made easy and reliable by using 12V DC motor, the motor works with the battery used in vehicle. The rotary motion is transferred from motor to lead screw through worm gear drive. The gear which is mounted on motor shaft is pinion and the driver gear is mounted on lead screw caused to transfer rotary motion. By fabrication of screw Jack it is easy to operate and lift the heavy loads by pressing the switch.

Batriwala etal. [12], they have review on failure of screw Jack which is used to lift light motor vehicles during servicing. This review is meanly target that the how much scissor jack can sustain the load and also the stresses analysis and life of various parts like power screw, base plate etc. There main aim is to make the Jack light and chipper and strength.

Brigham etal. [13], in UG engineering courses slider crank mechanism is used for examining machine kinematics and resulting dynamic forces. Determination of the position, velocity, acceleration, and shaking forces generated by slider crank mechanism during an operation can be obtained analytically. From analytical calculations certain factors are often neglected, that cause difference between results and experimental data. Record of kinematics and Dynamics forces data during operation can be made which can be further compared to analytical values by mounting transducer to mechanism.

Chandrakarv etal. [14], in the field of mechanical engineering the mechanism which is mostly used is slider crank mechanism. Combustion ignition and spark ignition engine use slider crank mechanism and in today's era it plays absolute necessity. Over past 20 years, extensive work has been conducted in the study of dynamic behavior of interconnected rigid or flexible bodies, i.e. kinematics and dynamics effects of the slider and crank mechanics. Design software such as MSC. ADAMS were used to develop the simulation model of slider and crank mechanism. Response of reaction forces at joint between crank shaft and connecting rod is observed by performing simulation at different crank speed. An artificial intelligence technique predicts the design parameter based on simulation model.

Venkateswarlu etal. [15], Power electronic converter controlls various electrical machine like DC motor, brushless DC motor, permanent magnet DC motor. With the invention of micro controller and power devices likes IGBT, power MOSFET controls have become more precise. An attempt to imitate the appearance or character of a speed control of separately excited DC motor with PID and fuzzy controller has come in light in this paper. Providing efficient method to control speed comprehensive study of modelling analysis and speed control design methods has been demonstrated in this paper. Fuzzy controller for comprehensive study of modelling analysis and speed control design method has been demonstrated with the availability of MATLAB/SIMULINK.

Tae – Yang etal. [16], a light weight library to develop Bluetooth related application in Android environment for wireless sensor network is presented. Enquiry, authorization and connect are some basic steps which can be applied for Bluetooth based communication. Beginners find the development difficult to handle Bluetooth even though google provided a Bluetooth handling API as an Android SDK and a tutorial. For an ease to use API in Android platform considering the difficulties, to help developers develop Bluetooth application easily they designed a standard library which is called Mosca Bluetooth.

Yang-Hang etal. [17], location of target or cell phone position from the measured RSSI (received signal strength Indication) strength is abled using the built in Bluetooth in the cell phone as the positioning device. In this paper, the use of 3-point localization method helps to determine the location of a target node, 3 RSSI values are collected from 3 test points in this method.

Kshirasagar etal. [18], unknown special characteristics of co channel interference which were discussed till date are revealed in this paper. In Bluetooth piconet, master's device address and its native clock determine the channel hop frequency at any instant of time. The Bluetooth device address and the asynchrony among their native clock determines the packet interference rate in a certain cluster of Bluetooth masters.

Poonam etal. [19], bluetooth Based Smart Automation System Using Android, in this project they focused on to reduce human effort. As the word automation is automatic control of operating devices which helps to reduced human efforts. In today's world, wireless technology plays important role in the automation. Home automation is one of the technologies emerging these days. It can be operated with in 100m and the Bluetooth which is mainly used for data exchange, the idea behind this paper is to control home appliances like lights, fan and also it provides home security and emergency alerts to be activated. It also helps in saving the energy at the night. This project is not going to help common people but also it helps disable and senior citizens.

Cotta etal. [20], the transfer of information between 2 or more points that are not connected by an electrical conductor is called wireless communication. Among wireless technologies radio is most commonly used. IR wireless communication, satellite communication, broadcast radio, microwave radio, Bluetooth, Zigbee are different types of wireless communication. Wireless communication using HC 05 Bluetooth module, network topology and interfacing Bluetooth with Arduino has been discussed in this paper.

Wadhani etal. [21], the brief idea about the use of IOt (internet of things) and how this technology been used in day to days life making the life of the human being easy and simple. IoT is the technology which is related to all the wireless devices which controls the several devices from one device, the project has made use of this IoT technology in automation of smart home and security techniques. The Arduino is used for interfacing the sensors. The components in use are Arduino UNO Board, Relay, DC Motor, Flex sensor, Wi-Fi Module, Reed Relay sensor, Flame sensor, Accelerometer, Arduino IDE, LDR. The electronically control device data is been uploaded on the cloud and control through the programmed wireless device. The aim of the project was the application of IoT in smart home automation and security system making the home more secured for human beings.

Kang etal. [22], the project is about the IoT (Internet of Things) along with uses and application. The user has to just provide the input and the output is obtained it may be work done or machine or some other wireless device. Due to this IoT technique may several devices can be controlled through one single device for this both the device is connected to the same network. The study gives the idea of how IoT is used everywhere and made reliable for use. Using this technique, the user just needs to provide command feed and the other side we get output within in seconds, for e.g. if a operator gives input to operate the machine using a wireless device the operator command is passed on the machine and the machine does the job. With the use of IoT the user can get the output or work done with or without His/her presence.

Bhagat etal. [23], the study of IoT and its application in the automobile sector. As now the car parking has become the most major problem, to park car in public places like market place, malls etc the driver needs to first find out the empty space in which the most of the car fuel gets used just only to find the space for parking a car. This IoT technology has solved this problem of finding the space for car parking at public. The operation is simple as soon as the car enter the parking place the systems detects the empty space and informs to the system and then space gets reserves the space by not allowing the many user to reserve the same parking space, to avoid the multi-user approach problem (MUAP) during parking reservation procedure the system has a Multi-Queuing Mechanism (MPQM) .

After studying and searching the research papers and collecting the information about the hydraulic jack and the

automation done in the project it was observed that the use of jack is still difficult to operate, the womens, senior citizens and handicapped people are still finding it difficult to operate the hydralic jack while changing the tires in case of emergency. So the research are still going on in order to make ease for operation of the hydraulic

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