Android App Operated Screw Jack for Automobile

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Abstract

With the increasing levels of technology, the efforts being put to produce any kind of work has been continuously decreasing. The efforts required in achieving the design output can be effectively and economically be decreased by implementation of better designs.

Power screws are used to convert rotary motion into translator motion. A screw jack is an example of a power screw in which a small force applied in a horizontal plan is used to rise or lower a large load. The principle on which it works is similar to that of an inclined plane. The mechanical advantage of a screw jack is the ratio of the load applied to the effort applied. The screw jack is operated by turning a lead screw. The height of the jack is adjusted by turning a lead screw and this adjustment can be done either manually or by using a powersource.

This jack can be operated using an android mobile. Bluetooth module is connected to the controller to take the commands from the mobile, so that motor can be rotated to lift the jack. Here we are using AT89S52 as our controller.

I. INTRODUCTION

Now a days in the middle of journey changing a tyre for a greater than or equal to four wheeled automobile is difficult to some extent .Due to the problem, operation of screw jack uses human effort. It also consumes much time in lifting the vehicle .Our idea depicts to reduce that human effort in operating the screw jack [1]. We use absolute screw jack(scissor type) and some software stuff to develop the above mentioned project and created the solution to a better extent.

By using our screw jack we can lift the vehicle by using an android mobile since it is a common tool in everyone's hand. In our project we coupled a mechanical device with a software platform and the result "The Things Became Much Easier" thus, by using this screw jack is easy to operate and the problem can besolved.

Here in our project the mechanical advantage is more and also the human effort is less .Here the law of conservation of energy is applied [2]. As our project uses a mechanical component that is screw jack and it is combined with software platform and this comes under the category of mechatronics section.

II. MAINCOMPONENTS

The following are the main components that are employed in our project. We have mentioned each and every details and the no of quantities we have taken and tabulated below.

S.NO	NAME OF THE COMPONENT	MATERIAL USED	QUANTITY IN NO'S
1	SCREW JACK(SCISSOR TYPE)	LOW GRADE ALLOY STEEL	1
2	TRANSFORMER		1
3	BRIDGE RECTIFIER		1
4	POWER REGULATOR		1
5	MICRO CONTROLLER(AT89S52)		1
6	BUZZER		1
7	H-BRIDGE		
8	CRYSTAL OSCILLATOR		
9	S.M.P.S		
10	ELECTRICAL WIRES	COPPER WIRES WITH INSULATION	15
11	L.E.D	RED AND YELLOW	4
12	WIPERMOTOR(12V D.C)		1

III. QUALITY MATERIALS USED FOR WORKINGMODEL

S.NO	NAME OF THE COMPONENT	QUALITY MATERIAL USED	QUANTITY IN NO'S
1	SCREW JACK(RESIPROCATING TYPE)	HIGH GRADE ALLOY STEEL	1
2	POWER REGULATOR		1
3	SPUR GEARS		2
4	HEAVY WEIGHT LIFTING JACK		1
5	CASTE IRON BRACKETS TO CARRY WEIGHT	HIGH GRADE ALLOY STEEL	3

IV. CIRCUITDIAGRAM
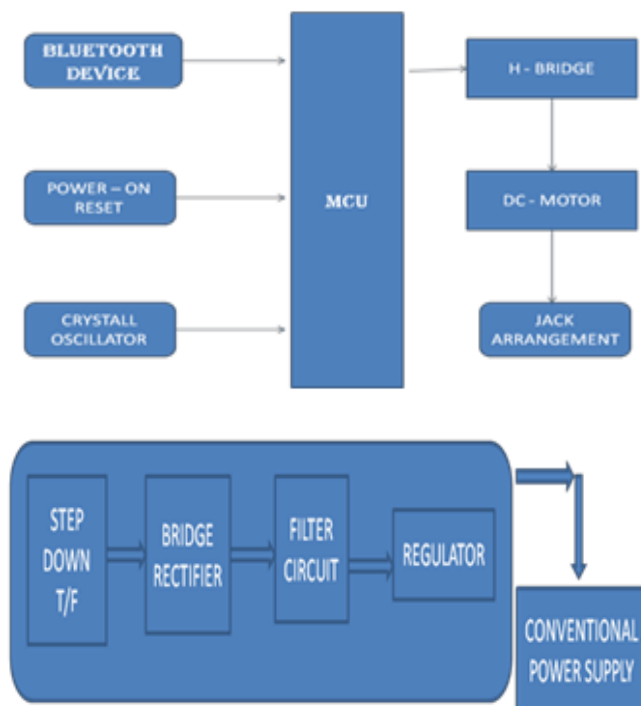
The bluetooth module is connected to the Micro controller unit .so that it can receive and execute the commands from the android .The microcontroller acts as a small computer in our circuit and it controls [3] the operation of our screw jack at a stipulated signals as well as it operates the wiper motor which is coupled to a screwjack.

V. WORKING

Our project contains the above mentioned circuit board in which the electrical energy flows through a step down transformer and converted in to the required voltage and flows through the microcontroller unit .Here, the controller is activated and controls the Bluetooth module and smps, H- bridge and to the motor [5].

Now H-bridge controls the rotary motion of our motor. By connecting H-bridge to the motor, it acts like a stepper motor. And this motor is coupled to jack and the resulting controlled motion is obtained. This motion is controlled by a android platform which is installed in our mobile.

To create a precise frequency of pulse we employed a crystal oscillator, in which due to the piezoelectric effect the required frequency of pulse is generated. To utilize the power efficiently a SMPS (switch mode power supply) is incorporated [4].To convert our input into ac/dc a bridge rectifier is used. We used piezoelectric buzzer to recognize the movement made by the screwjack.

VI. APPLICATIONS

- Used to lift automobiles(upto 1ton)
- Used to provide mechanical advantage
- Used for removing tyres for automobiles
- Can be used to impart push and pull motions wherever required
- Can be used with pneumatic applications
- Can be used as a robotic arm for welding purposes

VII. ADVANTAGES

- Mechanical advantage is more
- Ease of operation
- Provides multifunctional operations
- Low cost of maintenance
- Portability is achieved
- User friendly operations
- Can easily be connected to a automobile battery

IMAGES

VII.FUTURE SCOPE

As we used a electronic circuit, by bringing minor adjustments we can implement other operational functions. To the circuit we can connect a robotic arm in such a way to remove the nuts of automobile tyres .We also can attach a paint sprayer to spray the paint. There is a ease of connecting a portable air compressor in such a way that the tyre can be filled with the air if necessary.

REFERENCES

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