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Design and Fabrication of Motorized Scissor Jack

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Abstract : *Our main objective is to create a motorized jack that may save time, be quicker and easier to operate, needs less human energy and extra work to work and additionally safe, reliable and able to raise and lower the extent. Most of the individuals. Area unit aware of the essential automobile jack (manually operated) that's still enclosed as commonplace instrumentation with most new cars. Operating the manual automobile jack is kind of tough job for primarily women's and recent men cannot be used on the uneven surface. The aim of this project is to encounter these issues. The automated car jack primarily works on the conservation of the motion that converts the rotation into the translatory motion. The automated automobile jack is operated by turning the leadscrew with the motor that is controlled by victimization the mobile. The motor is driven by the 12V battery that is generally the battery of automobile itself.*

Keywords*: Light moving vehicles, Integrated automated jack, Scissor Jack, Chassis, Power Screw, Microprocessors.*

1. INTRODUCTION

A jackscrew could be a device that is employed to lift a part of a vehicle so as to facilitate vehicle maintenances or breakdown repairs. In traditional Jack system a mechanical jack is employed for lifting the vehicles. The foremost common form could be a automotive jack, garage jack, floor jack that lifts vehicles so maintenance is performed. Car jacks generally won't to increase ratio whereas lifting the vehicle. Generally the load of the vehicle is near concerning the one tons. A such jack will foot-dragging to a thousand kilograms, however tests taken by client Affairs has revealed that's fails to figure when lifting 250 kilograms and may physically break once it's a weight getting ready to its a thousand kilograms capability. Tests have tested that the jack has the tendency to consent the load it's promoted to withstand. For this reason, we've got to developed the system which may use with toggle jack is automatic in operation. Meaning with the assistance of the electrical motor. For this motor we've got to

use the vehicle battery is as source. In this, vehicle battery ought to be a 12V DC motor with some torsion that is needed to beat the thread friction and to lift the load.

2. OBJECTIVE

- To style an influence cut jack that is safe and reliable to raise and lower the load simply.
- Use of double begin sq. thread in power screw.
- Pins in bearings.
- To fabricate the model of a cut jack. To
- succeed production
- To cut back the assembly value and time.
- To realize smart product quality.

3. NEED OF INVENTION

In the world, the actual fact is that necessity is that the mother of invention" and also the necessary condition is that, massive effort is needed for the manual operation of jacks, thus for that reason, it's the requirement of invention. Within the repair and maintenance of cars, it's usually necessary to lift an automobile to vary a tyre or access the lowest of the automobile. Consistent with that, varied automotive jacks are developed for lifting associate degree automobile from a ground surface. In that case, they're classified as; commonplace jack, pneumatic jack, farm jack, hydraulic jack. Usually the standard jack uses the facility screw for lifting. These standard jack has restricted degree of freedom with corresponding link members. In Hydraulic jack, incompressible fluid is employed rather than screw for lifting. Which is achieved by increasing the fluid pressure in cylinder to uplift the load. Offered jacks are usually large, serious and conjointly troublesome to store, transport, carry or move into face of associate degree automobile. Doing add a bent or occupying position for a amount of your time isn't ergonomic to frame, i.e. it's not utterly desirable in biotechnology purpose of read. it should pay problem whereas continuous operating with same. Engineering is most well-liked for creating things easier or rising and effective, for that automotive jacks should be simple to use for pregnant ladies. The overall purpose of the project is to minimize the human effort whereas operative the jack.

4. LITERATURE REVIEW

Screw sort mechanical jacks were terribly usually referred in jeeps and trucks at warfare II vintage. For ex., the planet War II jeeps (Ford GPW and Willys MB) were introduced with the Jack, Screw type, capability one 1/2 ton, Ordnance half variety 41-J-66. In this days, the 41-

J66 jack was carried within the jeep's tool box. Screw sort jacks preferred continued for tiny capability use because of minimum cost of production for raise or lower the load. It had negligible maintenance. The conception of employing a screw as a machine was 1st demonstrated by Archimedes in 200BC along with his device used for pumping water. There's conjointly proof that screws were most popular within the Ancient Roman world. But, within the late 1400s, the old master technologist, United Nations agency 1st displayed the method of use of a jackscrew for lifting the hundreds. Its design used a rib gear wheel, supported on bearings, which is revolved by the turning of a worm shaft to drive a lifting screw to maneuver the load instantly place able because the principle used nowadays. Thomas J. Prather (2009): during this, there was a introduction about vehicle raise system. A drive assembly was mechanically coupled to the piston. The drive assembly was operated in 1st direction to lift associate higher finish of the piston with relevance the housing. The drive assembly was operated during a second direction to lower the higher finish of the piston with relevance the housing. The drive assembly was coupled to the ability provide port that is removable to supply wattage to the drive assembly.Farhad Razzaghi (2007): during this, electrically high-powered jack shown for usually raising and lowering of automobile from ground surface. The mechanism is also employed in joining with a typical transportable automobile jack, throughout that the mechanism represent an influence drill, a rod, and a varied jack adapters. Manoj Patil (2014): during this general article, jackscrew is too developed to beat the human effort. it's truly difficult job to work for pregnant ladies and golden ager.Changing the tyre isn't a pleasing expertise. For that, electric operated automatic jack is introduction Lokhande Tarachand (2021): This paper noted Optimise the potency of sq. rib mechanical screw jack by varied totally different angle.

5. COMPONENTS USED

Power Screws

A power screw is a mechanical device used for converting rotary motion into linear motion and transmitting power. A power screw is also called translation screw. It uses helical translator motion of the screw thread in transmitting power rather than clamping the machine components.

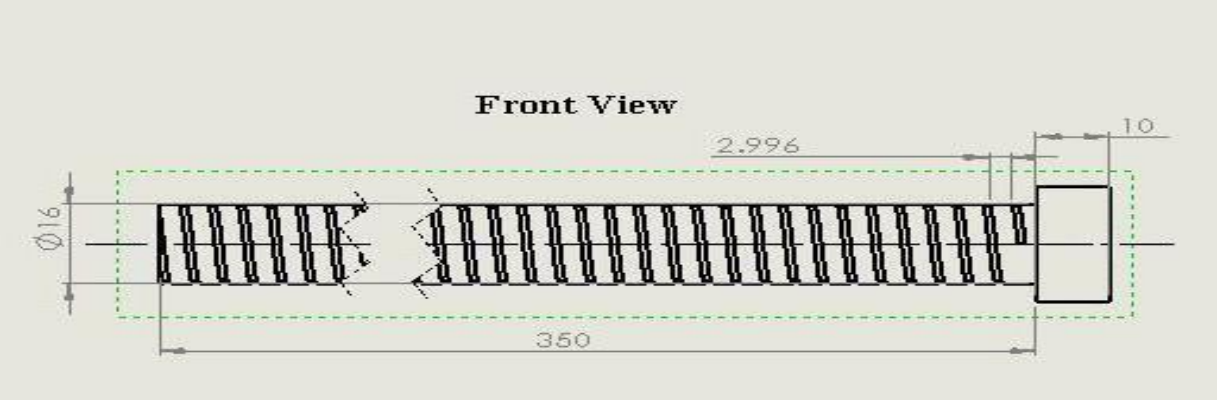

Fig. 5.1: Power Screw

Geared DC Motor

A DC motors and gear motors with permanent magnets are also known as Brushed Electrical Motors. The rotor, winded in a copper wire connected to a collector, constitutes the rotating part which transmits the mechanical power. The tension in DC motors is transmitted to the rotor through the sliding contact between brushes and collector.

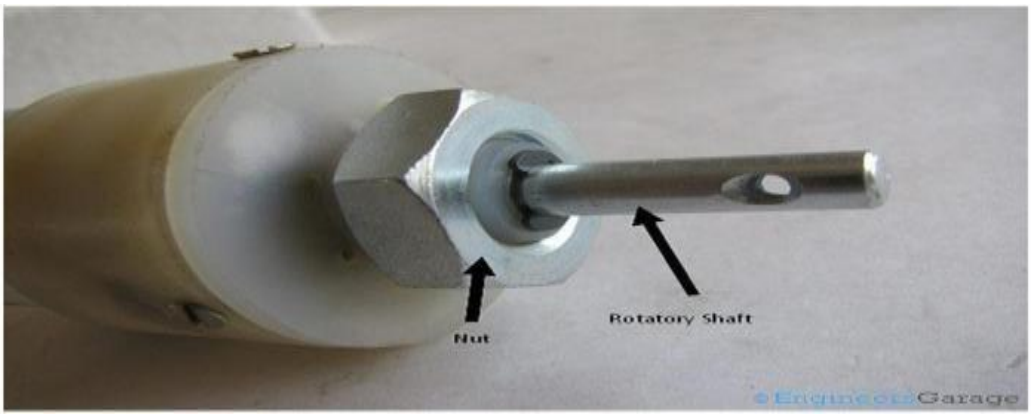

Fig.5.2: DC Motor

Arduino Uno R3

Arduino UNO is a microcontroller board based on the **ATmega328P**. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

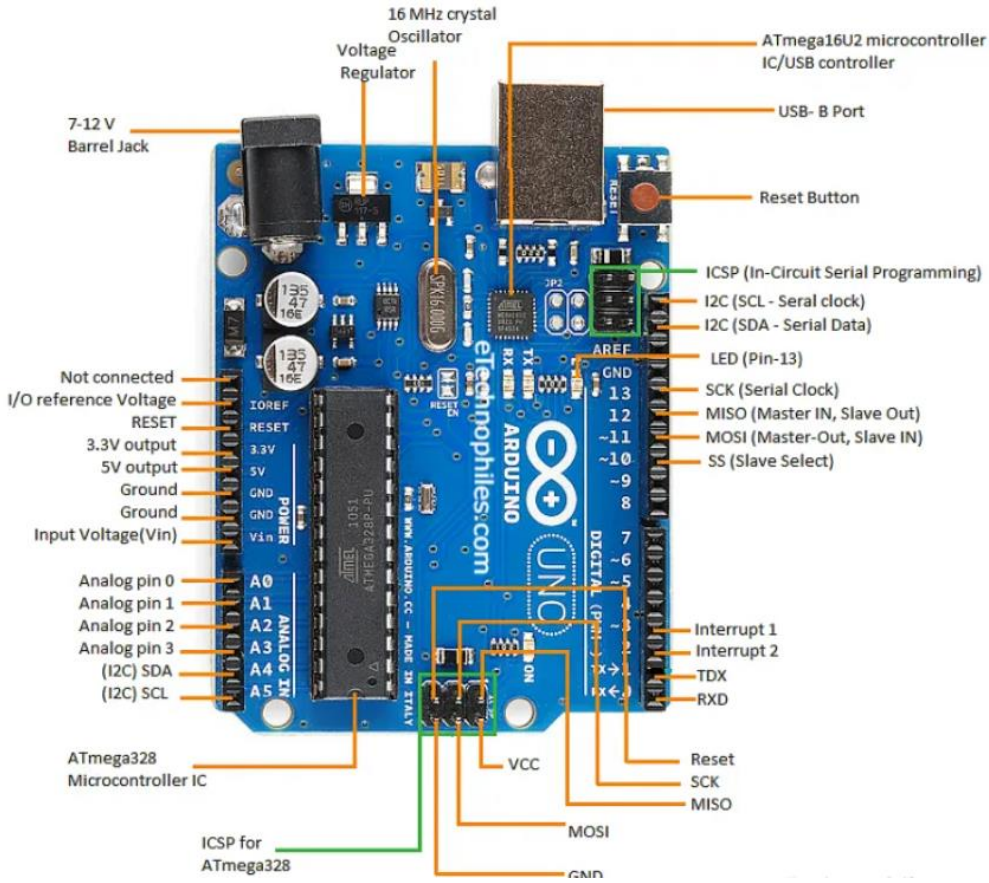

Fig. 5.3: Arduino Uno R3

Bluetooth module

A 12v 40w 60rpm DC motors to drive the gear drive to work the bucket conveyor and to slip the sand sieve box on guide ways in which. An electrical motor could be a machine that converts power to energy. Its action relies on the principle that once a current-carrying conductor is placed in a very field, it experiences a magnetism whose direction is given by Fleming's manus rule. Among the four widespread wireless connections that always enforced in HAS project, Bluetooth is being chosen with its appropriate capability. Bluetooth with globally on the market frequencies of 2400Hz is ready to supply property up to one hundred meters at speed of up to 3Mbps looking on the Bluetooth device before implementation of Bluetooth-based application on the phone, many software package packages are needed that embrace Java Development Kit (JDK), the Eclipse software package setting, mechanical man Development Tools ADT) and mechanical man SDK (Software Development Kit).

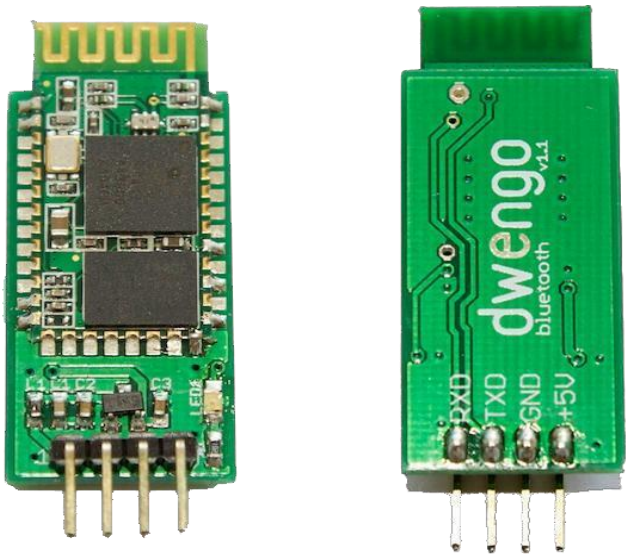

Fig. 5.4: Bluetooth device

Relay

Relays are the switches which aim at closing and opening the circuits electronically as well as electromechanically. It controls the opening and closing of the circuit contacts of an electronic circuit. When the relay contact is open (NO), the relay isn't energize with the open contact. However, if it is closed (NC), the relay isn't energize given the closed contact. However, when energy (electricity or charge) is supplied, the states are prone to change.

FINAL VIEW OF SCISSOR JACK

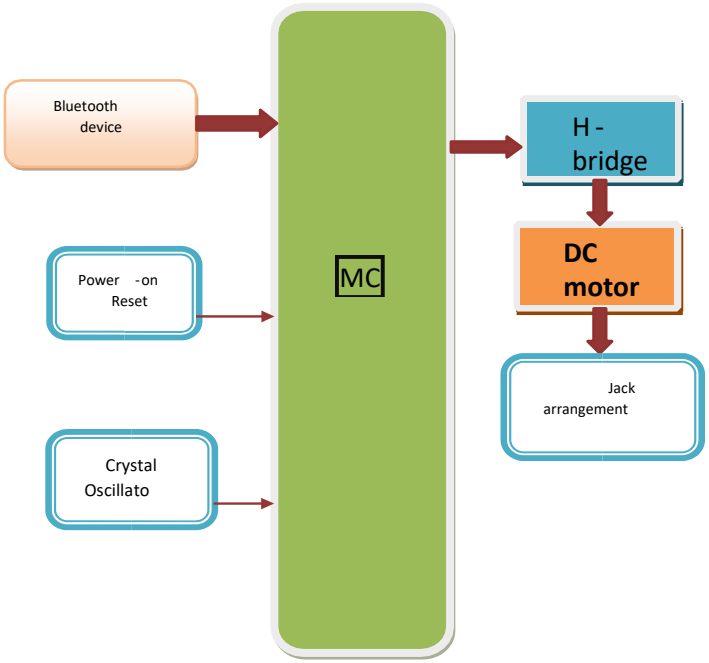

Fig. 5.5: Final View of Scissor Jack

ADVANTAGES

Checking and cleanup area unit simple, as a result of the most elements area unit screwed.

- Handling is straightforward.
- The loaded light-weight vehicles are often simply raised.
- No Manual power needed.
- Easy to Repair.
- Replacement of elements area unit simple.

DISADVANTAGES

- Cost of the instrumentality is high compared to normal hand jack.
- Care should be taken for the handling the instrumentality like correct wiring association, battery charging health check, etc.

COMPARISON WITH MANUAL JACK

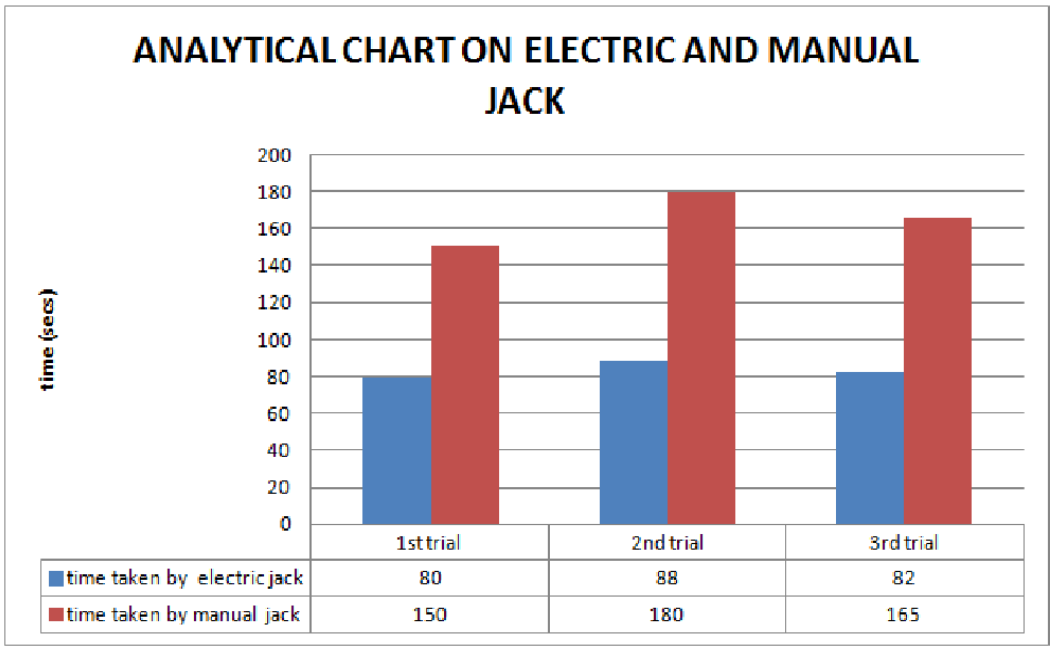

Fig.5.6: Comparison between manually operated jack and Motorised screw jack.

6. CONCLUSION

The existing style was changed by introduction of an electrical motor within the power screw, connecting lead screw to the motor shaft, the electrical switch connected to the motor and obstructed to the auto 12V battery supply to get power for the causal agency (motor), so as to make load lifting easier. During this changed style, the ability screw is turned through the motor when wattage flows through it.

This automatic automotive jack can minimize the human efforts which is needed to control a jack manually. This whole system is controlled by victimization Android application. 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.

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