



AN ANALYTICAL RESEARCH ON ANTI THEFT WHEEL LOCKING SYSTEM

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Abstract-

This concept aims to prevent bike theft by using a wheel locking device to reduce the likelihood of theft. Solenoid switches serve as the primary tool for locking the bike's front wheel. The solenoid device measures and regulates the path's linear movements. An electronic plunger attached to a battery-operated power supply device controls the to-and-fro action. Levering the brake allows the drum braking system to work. Drum brakes operate while the ignition key is held in the off position. When the ignition key is configured to be in an OFF status or to be idle, the issue is controlling the solenoid activity. In the event that an unidentified individual steals the mobile device, the microcontroller ought to react by detecting movement of the front wheels and initiating the solenoid. The solenoid switch has a 12 volt power supply and a 5 amp current. The battery has a 12 volt output and a 7 amp current.

Keywords—

Solenoid Switches, Electronic Plunger, Battery-Operated Power Supply Device Controls, Action.

INTRODUCTION

Wheel thefts are becoming a more frequent issue for car owners than they have in India, a nation that is rapidly developing. Wheel vandalism is becoming more common since it's so simple for even the most ignorant individual to commit just unscrewing the nuts and unscrewing the bolts. The situation becomes worse since criminals are using more advanced methods these days. The problem is prevalent in almost all areas ranging from rural areas to metro cities. Till now, the companies which fit an anti-theft device for wheels prove to be very expensive for a middle income customer. The overheating of the tyres, till now is not seen as a major problem for the automobile industry. But now, as concrete roads are paving way for a sustainable future. It is also known that the temperature of the tyre increases more when plying on concrete roads compared to older bitumen roads. There is no major development in this field as to how the temperature of the tyre should be maintained. A car has three braking system the accelerator, the gears and the brakes themselves. A controlled, well anticipated and unhurried act of slowing down or stopping will involve the use of all the three. With proper observation of the road and traffic ahead, a driver can see the need for a reduction in speed long before, he has to control the vehicle by applying the brakes. The purpose of this anti theft wheel locking system project is to hinder the theft of bikes with the help of wheel locking system. To lock the front wheel of the bike solenoid switches are used as the main tool. The linear motions of the path are monitors and controlled by the Solenoid device. The to and fro motion are controlled by a plunger which is connected by a battery power supply device. Drum brakes system function enables with the brake lever. When the ignition key is kept in off stage the drum brake activate function. The problem is to manage the solenoid action when the programmed the ignitions key in OFF condition or in idle states. If the mobile is theft by the unknown person then the micro controller should perform an action by analyzing front wheel motion gets activate the solenoid action. The solenoid switch consist of power voltage 12v and current of 5amps .The battery consists of voltage 12v and current of 7amps.



ANTI THEFT WHEEL LOCKING MECHANISM

Wheel locking occurs the friction between the shoes and brake drum exceeds the friction between the tyre and road surface. Frictional force is essential for gripping the tyres on the road surface. The brakes will stop the car more quickly when they are not locked and also the wear and Lear on the tyres are greatly reduced. Maximum braking effort obtainable is greater with low pressure than with high pressure tyres as the former hold the road better. The chief objection to locking of the rear wheels is that it is almost certain to throw the car into a skid. The advantages of four wheels over two wheel brakes are that the former materially reduces the skidding tendency of a car. When there are brakes on two wheels only it takes only about one half of the pedal pressure to lock them. On greasy roads even a slight applications is likely to lock a pair of rear wheel brakes unless the engine is in gear and once the wheels are locked they will slide easily sideways as forward. All that is necessary to start a skid is that the centre line of resistances encountered by the front wheels does not pass through the centre of gravity of a car or of a car or if one front wheel encounters greater resistance than the other locking the front wheels will not produce a rear wheel skid. The function of a vehicle brake is to stop down slowly it by when moving or to prevent it from moving when it is stationary. A brake works by causing by the friction between a non rotating part of the car and a disk or drum which turns on a road wheel. The force produced by the Friction slows down the car and convert the energy of the moving vehicle into heat energy, which disperses into the air around the brakes. The pressing force simultaneously produces the relative motion when the natures of surfaces are in contact. Within certain limits the retarding force due to brakes application is proportional to the pressure with which the bands or shoes are applies to the drums and to the coefficient of friction between lining and drum. However when the force of application reaches a certain value. The brakes lock and the road wheels slide over the pavement, hence any further increase in the force of application has no effect. Thus the maximum braking effect which can be produced depends on the adhesion between tyre and road, which intern depends on the load carried by the wheels on which the brakes act and on the coefficient of friction between tyre and road. The speed of conversion of the kinetic energy into heat energy governs the rate at which the vehicle slows down.

CONSTRUCTION

The lead-acid battery consists of a group of plates inside the closed chamber. It consists of positive and negative electrodes and is welded to the Connecting strap. These plates are immersed in the electrolyte solution having 8 parts of water and 3 parts of concentrated sulfuric acid. Each grid of the plate is made up of lead-antimony alloy material. Enabler of lead oxide are coated on the plates in the form of grids are used to active the material. The positive and negative electrodes on the lead acid battery are manufactured by forming process procedure. In this process active material are in the positive plate that are changed to lead peroxide (PbO_2) and the negative electrode is by spongy lead (Pb). Electrolyte solution is filled in the chamber before the installation of the battery when it is going to get charged to the plates. Safeguarding these free batteries from corrosion and pitting no water is added during their normal service. Most of the of batteries are potted excluding for a heaviness vent without provision for adding water.

(i) Battery- Batteries are used to store the electric energy. An inaccessible grid of excess solar energy is converted into electrical energy. For a small unit of productivity having less than one Kilowatt are used for the applications such as irrigation pumps or drinking water supplies with an exception of cut off sunshine load. Batteries having storage availability are cost-effectively. Photo-voltaic system and batteries are high in assets costs and the overall system be optimized with respect to the existing energy and local demand pattern. The commonly used batteries are Lead- Acid Wet Cell having high values of load current And are obligatory the lead- acid cell. The electrolyte solution is a dilute solution of

sulfuric acid (H_2SO_4) having the application of authority to start the engine of the automobile. The secondary storage of the lead acid cell

stores the energy that is revitalized with the primary battery. To keep the cell on good condition, output voltage is restored in the storage. The expulsion current short ends the heat with excessive charge.

(ii) D.C. Motor (Permanent Magnet)-To change electrical energy in to mechanical energy electric motor is are used. The left hand principle of Fleming is to accomplishment the magnetic field, by changing the current carrying conductor with the use of magnetic force. High torque are produced in the change of magnetic flux and act as a DC motor thus produces mechanical rotation because of the shunt wound or series or compound wound motors.

(iii) Magnetic Field- Magnetic fields are caused by the electric current and electric material used. Magnetic field is a vector quantity. Electric charges are produced by the rotational moments of the elementary particle associated with the quantum theory is quantized by the exchange of electrons. Attraction and repulsion of forces creates a rotational moment inside the electric motor.

(iv) Electromagnets and Motors- An electromagnet works on the basics of an electric motor. Powers are produced by the magnet by a simple electromagnet wrapping of 100 loops of wire around a peg and are connected it to a battery. The nail would become a magnet and having a North Pole and South Pole while the battery is connected. Because of the way magnets naturally attract and repel one another, this half-turn motion is simple and understandable. The moment of the electromagnet has a half-turn of motion takes the one complete field of the electromagnet and flips away. The turn over causes the current on the electromagnet on complete another half-turn of motion.

(v) Bearing with Bearing Cap- The bearings are pressed smoothly to fit into the shafts because if hammered the bearing may develop cracks. Bearing is made upon steel material and bearing cap is mild steel.

WORKING PRINCIPLE

This system uses a four bar mechanism, that follows a coupler curve. It has a greater advantage than the existing system of transport of work piece in a factory. The materials are transferred from one work station to another at a specific time interval, which is based on the movement of the linkages. In a continuous assembly factory, there is a need to transfer materials or on process jobs form one working station to the other. In this process, the movement of job from one station to another is accomplished by a belt conveyor system. System uses an electric drive which is continuous. So the operator does not get sufficient time to complete the operation. Thus the jobs are usually picked and placed on to the work station and the job is processed. This is a tiring and a time consuming job. Also for heavy materials, a separate setup is required for the pick and place operation. This paper proposes the model of at imbed transport mechanism. This system uses kinematic linkages for timing the transportation. It uses a four bar mechanism, that follows a coupler curve. It has a greater advantage than the existing system of transport of work piece in a factory. Four bar chain is a mechanism of four bar linkage. Links consists of four bodies called bars of linkages connected in a loop by four joints.



Figure 1- Fabricated Model of wheel

The simplest movable link closed to the chain linkage. All the joints are configured so that the links are move in parallel planes, and the assembly is so called a planar four-bar linkage. All the four Linkages with axis angled are to interconnect at a station point are hinged on a concentric point. So



that the links move on concentric spheres of the assembly is called a spherical four-bar linkage as shown in figure1.

HARDWARE SYSTEM DESIGN

(i) Ultrasonic sensor (HC-SR04).- In this paper, this sensor senses (measures) the distance between the hub (place where wheel is connected to the shaft) and the distance to which the wheel has been moved.

(ii) Temperature Sensor (LM35).- In the sensor senses the temperature of the tyre surface when the vehicle is moving. It gives the value of the temperature on the LCD display. The sensor has the features like the high-accuracy version of the LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^{\circ}\text{C}$ at room temperature and $\pm 3/4^{\circ}\text{C}$ over a full -55 to $+150^{\circ}\text{C}$ temperature range.

(iii) Microcontroller (AT89S51).- All the information given by the sensors are processed in the microcontroller and necessary reaction is given by the output units (buzzer, GSM, servo motor) with the help of the programming which has been done in the micro controller. The features of the micro controller are:-

- The microcontroller is the heart of our project. AT89S51 works on low-power, high-performance CMOS 8-bit microcontroller with 4KB of ISP flash memory.
- The device uses Atmel high-density, non-volatile memory technology and is compatible with the industry-standard 89S51 instruction set and pin out.
- On-chip flash allows program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer.

CONCLUSION

The model of a timed transport mechanism is used in this manufactured component. Kinematic links are used by this system to time the transit. A coupler curve is followed by a four bar mechanism. It is more advantageous than the factory's current work item transportation method. Our main aim of this design was to introduce a product which is both affordable and accurate which will prevent the stealing of wheels. As the numbers of wheel thefts are increasing in India, we need to have a system which will help to keep a tab on these thefts. In rural areas, this system would be extremely helpful as sometimes the police stations are far located from the villages. The other advantage of the system is to increase tyre performance by keeping the temperature of the tyre at controlled values which will help increasing the life of the tyre. Another hidden advantage of the system is that the product can also be helpful if the vehicle has been stolen as the location of the number can be traced which we have fitted in our GSM module. As a result, the proposal suggested a paradigm in which the materials are delivered gradually. This offers a significant benefit over the current systems.

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