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FABRICATION OF PNEUMATIC BUMPER AND BRAKING SYSTEM

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ABSTRACT - The technologies are developed in the field of automation that integrates heavy growth of vehicles for public transport. According to Indian road transport situation the Accident are major problem to the Vehicles, to avoid this we developed Anti- collision system especially for four wheelers. The system is based on intelligent electronically control system. This system activates brake as well as extends the bumper from its initial position to reduce the damage caused during collision. The infrared sensor (IR), which is used to sense the colliding object (Obstacles / Human / Any Vehicles in specified range of distance) which is responsible for accident. Then sensor sends feedback signal to the control unit, there by activating the solenoid valve for an activation of system. During the working of Automatic braking system simultaneously the driver can also try to stop the vehicle by pressing brake pedal. Extended bumper with the help of pneumatic pressure reduces the damage to vehicle which occurs in accidents. This system provides pre-crash safety to the vehicle. As well as it improves the response time of vehicle braking to keep safe distance between the vehicles. By using this system we can obtain control the over speed vehicle in short distance.

Key Words: Infrared sensor, Solenoid Valve, Pneumatic Cylinder.

I INTRODUCTION

We have pleasure in introducing our project "ANTI-COLLISION SYSTEM FOR FOUR WHEELERS". This is fully equipped by IR sensors circuit and Pneumatic bumper and braking activation circuit. It is the project which has been fully equipped and designed for auto vehicles. The technology of pneumatics plays a major role in the field of automation and modern machine shops and space robots. The aim is to design and develop a control system based on intelligent electronically controlled automotive bumper activation system is called "automatic pneumatic bumper and break actuation before collision". The project consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system. The IR sensor senses the obstacle. There is any obstacle closer to the vehicle (within 1feet), the control signal is given to the bumper and break activation system. This bumper activation system is activated when the vehicle speed above 80-100 km per hour. The speed is sensed by the proximity sensor and this signal is transfer to the control unit and pneumatic bumper activation system.

II MAJOR COMPONENTS

1. PNEUMATIC CYLINDER
2. WHEEL

3. SOLENOID VALVE
4. BALL BEARING
5. SHAFT
6. METAL STRIP
7. D C MOTOR
8. BATTERY
9. HOSE AND CONNECTOR
10. CIRCUIT

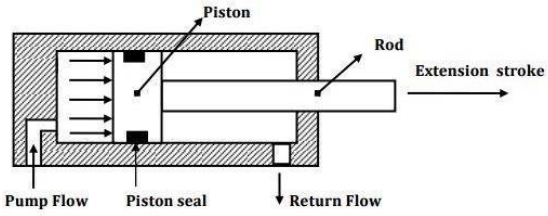
IR SENSOR RELAY

PNEUMATIC CYLINDER

Pneumatic cylinders can be used to get linear, rotary and oscillatory motion. There are three types of pneumatic actuator:

1. Linear Actuator or Pneumatic cylinders
2. Rotary Actuator or Air motors
3. Limited angle Actuators

Pneumatic cylinders are devices for converting the air pressure into linear mechanical force and motion. The pneumatic cylinders are basically used for single purpose application such as clamping, stamping, transferring, branching, allocating, ejecting, metering, tilting, bending, turning and many other applications.



Double acting cylinder

WHEEL

The materials of modern pneumatic tires are synthetic rubber, natural rubber, fabric and wire, along with carbon black and other chemical compounds. They consist of a tread and a body. The tread provides traction while the body provides containment for a quantity of compressed air. Before rubber was developed, the first versions of tires were simply bands of metal that fitted around wooden wheels to prevent wear and tear. Early rubber tires were solid (not pneumatic).

SOLENIOD VALVE

A **solenoid valve** is an electromechanically operated valve. The valve is controlled by an electric current through a solenoid: in the case of a two-port valve the flow is switched on or off; in the case of a three-port valve, the outflow is switched between the two outlet ports. Multiple solenoid valves can be placed together on a manifold.

BALL BEARING

A ball bearing is a type of rolling- element bearing that uses balls to maintain the separation between the bearing races. The purpose of a ball bearing is to reduce rotational friction and support radial and axial loads. It achieves this by using at least three races to contain the balls and transmit the loads through the balls. In most applications, one race is stationary and the other is attached to the rotating assembly (e.g., a hub or shaft).

SHAFT

Shaft is a common and important machine element. It is a rotating member, in general, has a circular cross-section and is used to transmit power. The shaft may be hollow or solid. The shaft is supported on bearings and it rotates a set of gears or pulleys for the purpose of power transmission.

The shaft is generally acted upon by bending moment, torsion and axial force. Design of shaft primarily involves in determining stresses at critical point in the shaft that is arising due to aforementioned loading.

Metal Strip

Metal strip is narrow, thin stock that is usually 3/16 in. (4.76 mm) or less in thickness and under 24 in. (609.6 mm) in width. Metal strips are formed to precise thicknesses and/or width requirements.

D.C MOTOR

The electrical motor is an instrument, which converts electrical energy into mechanical energy. According to faraday's law of Electromagnetic induction, when a current carrying conductor is placed in a magnetic field, it experiences a mechanical force whose direction is given by Fleming's left hand rule.

BATTERY

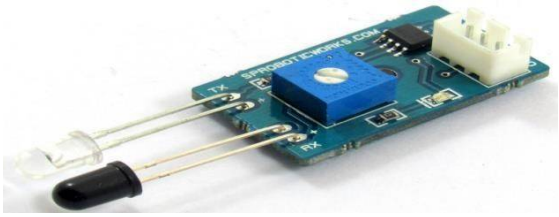
In isolated systems away from the grid, batteries are used for storage of excess solar energy converted into electrical energy. The only exceptions are isolated sunshine load such as irrigation pumps or drinking water supplies for storage. In fact for small units with output less than one kilowatt.

HOSE AND CONNECTER

A **hose coupling** is a connector on the end of a hose to connect (or *couple*) it with another hose or with a tap or a hose appliance, such as an irrigation sprinkler. It is usually made of steel, brass, stainlesteel, aluminium or plastic.

IR SENSOR

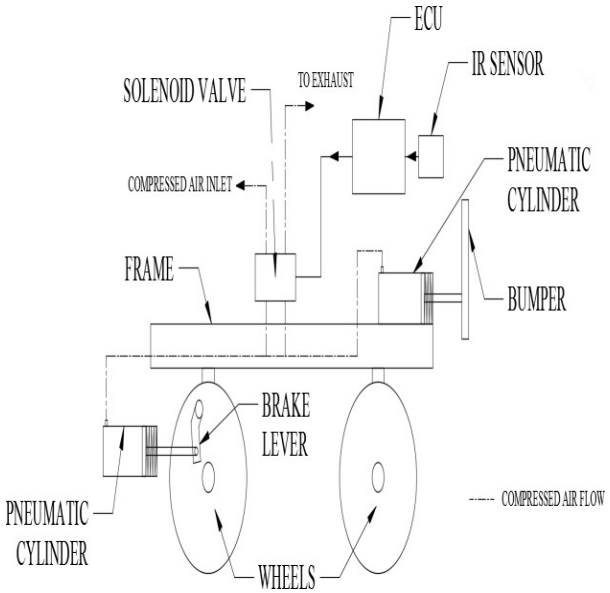
An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being



emitted by an object and detecting motion. A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.

III WORKING PRINCIPLE

When the infrared sensor senses the colliding object it sends the feedback signal to the control unit there by activating the solenoid valve to send the compressed air from the compressor which is coupled to it at one end to the two pneumatic cylinders which is connected on its other end. Due to this two pneumatic cylinders gets activated there by extends the bumpers from its original portion to certain distance and also activates the brake simultaneously to reduce the impact caused during the collision to vehicle.



IV CONCLUSION

Thus here a Pneumatic system is used to develop an **ANTI-COLLISION SYSTEM FOR FOUR WHEELERS**. The press will be useful for mass production of Washers. This may increase the productivity and increases the accuracy of the production. Even the press can be completely atomized by using the concept of (pneumatic / hydraulic). Direction control valve can be solenoid actuated to make the system close loop. This may lead to higher production rate.

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