Title: Design and Development of Automatic Braking System

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ABSTRACT

The aim is to design and develop a control system based on intelligent electronically controlled circuit called "AUTOMATIC BRAKING ON SLOPE REGION".In the hill station, the most common problem to the driver is to park their cars in the slope and to start up the car. While waiting in the traffic, the cars have to move on step by step very slowly, this situation is a difficult one for the drivers to make their car not to roll back in the slope. So the mechanism has to be developed to stop the vehicle from rolling back and it should not stop the vehicle in accelerating forwards. This function can be achieved by using the ratchet and pawl mechanism. The rachet[1]and pawl[2] has to be designed and has to be fit in the rear [3]drive shaft in case of the rear drive vehicles.In this work the instrument has been made to keep the vehicle from moving backward when the vehicle is moving in the slant roads. rachet[1] and pawl[2] part has been recognized to catch the development to the rear rotating axle. Antagonistic to Roll Back part has been produced in this mechanism.

Keywords*: Ratchet[1], Pawl[2]*

1. INTRODUCTION

In the incline station, the most understood issue to the drivers is to stop their car on inclination and to go in forward direction. While holding up in the action, the car need to continue forward very much requested step by step, this situation is a troublesome one for the drivers to make their car not to move back in the grade. So the instrument must be made to keep the vehicle from moving back and it should not stop the vehicle in reviving advances. This limit can be proficient by using the ratchet and pawl instrument. The ratchet and pawl must be arranged and should be fit in the rear drive shaft if there ought to emerge an event of the rear drive vehicles.

1.1 Problem Statement:

Design and develop a prototype model of showing the concept of automatic hill station braking system which will show the working of application of brakes in emergency conditions while driving on slopes in hill stations road conditions.Also fabricate the model of the same which will show the working desired by emergency braking on slopes in hill station roads.

1.2 Objective:

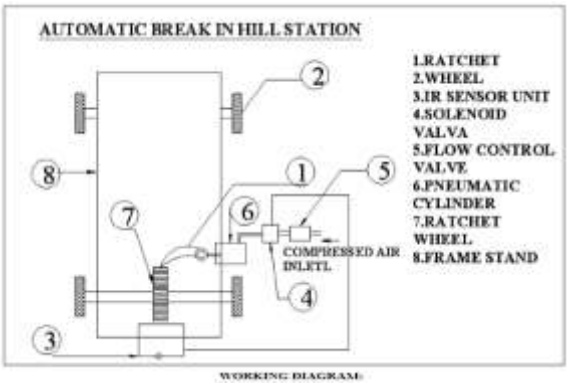
1. To Design and develop a prototype model of showing the concept of automatic hill station braking system while driving on slopes in hill stations road conditions.
2. To fabricate the model of the same this will show the working desired by emergency braking on slopes in hill station roads.

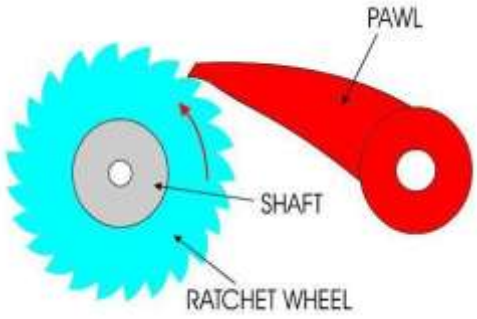
3. To provide safety options while driving in hill stations.
4. To test the model under different conditions of speed and slopes.
5. To automate the braking system by means of sensors and actuators.

1.3 Methodology

In this work, Ratchet and Pawl system is recognized to capture the retrogressive movement to the vehicle. The ratchet is set in the rear drive shaft and the Pawl is fitted with the edge. At the point when the vehicle is moved in the slope street, the lever needs to make the pawl to touch the ratchet. In the event that the vehicle tends to go in reverse heading, the pawl would stop the ratchet to move Counter Clock-wise course regarding rear wheel. As the vehicle is in impartial position, the pawl connected with the ratchet and the vehicle did not move in.

The Infrared Transmittercircuit is to transmit the Infra-Red beams. In the event that any obstruction is there in a way, the Infra-Red beams reflected. This reflected Infra-Red beams are gotten by the collector circuit is called "IR RECEIVER". The IR beneficiary circuit gets the reflected IR beams and giving the control flag to the control circuit. The control circuit is utilized to actuate the solenoid valve. On the off chance that the solenoid valve is actuated, the compacted air goes to the Single Acting Pneumatic Cylinder. The packed air initiates the pneumatic chamber and moves the cylinder pole. On the off chance that the cylinder pushes ahead, then the breaking game plan actuated. The breaking game plan is utilized to break the wheel steadily or abruptly because of the cylinder development. The point is to outline and build up a control framework based on a smart electronically controlled car slowing mechanism which is called as "Programmed BRAKE FOR HILLY REGION". This Braking framework is comprises of IR transmitter and Receiver circuit, Control Unit, Pneumatic breaking framework. The IR sensor is utilized to distinguish the slopes impediment. There is any deterrent in the way, the IR sensor detects the slopes snag and giving the control flag to the breaking framework. The pneumatic breaking framework is utilized to break the framework.





2.Formula Used

$\frac{M}{I} = \frac{\sigma}{Y}$,Bending Moment calculation

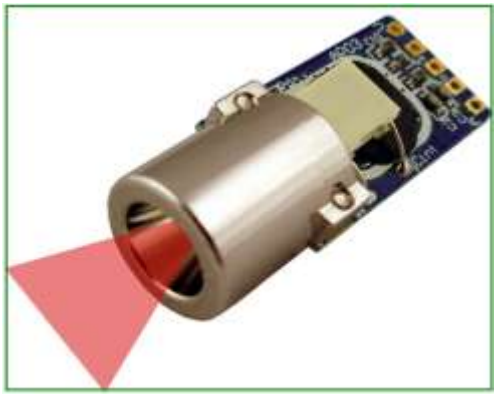
I=$\frac{bh\text{^}3}{12}$,Inertia of Rod

3.IR SENSOR: Working principle

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared

radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations.

These types of radiations are invisible to our eyes,that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and these output voltages, change in proportion to the magnitude of the IR light received.



4.Pawl Activator By Compressed Air:

4.1How does it work: Actuators

Every valve needs a means by which it can be operated (e.g., cycled or actuated). There are a variety of options to achieve this including: hand wheels, levers, gears, and actuators.Actuators are a means by which a valve can be automated so that no human interaction with the valve package is necessary to cycle the valve. Actuators can be remotely operated and can act as shutdown mechanisms in case of an emergency situation, wherein human interaction can be dangerous.

"At a basic level, an actuator is a control mechanism that is operated by an energy source. This energy can be hydraulic pressure, pneumatic pressure, or electric current which moves the internal mechanical parts of the actuator." said Russ Robertson, Cameron's actuation product manager, "They can be designed to fail-open (in the case of actuator failure, the valve will stay open) or fail-close (in the case of actuator failure, the valve will stay closed). They also are distinguished by whether they are for quarter-turn (e.g., ball valves, plug valves) or linear (e.g., gate valves) valve operation."

5. CONCLUSION

Thus the mechanism can stop the vehicle from rolling back on slopes. This would be more helpful for the drivers to drive their cars comfortably in hilly roads and he can take off the car in the uphill without rolling back the car.The project "automatic braking system on slope region"has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every component has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

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