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Automatic Braking System at Hill Station

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Abstract: *In this project work, the design and construction of a model automatic braking system for vehicles in the hill station are to be developed. The mechanism has been developed to stop the vehicle from rolling back word when the vehicle is moving on the hill roads. This construction is made in the first deigns of ratchet and pawl mechanism, frame, shaft, etc. Ratchet and pawl mechanism has been fabricated and assembly with spring interface is tested.*

Keywords: *Automatic braking, Hill station, Fabricated*

1. INTRODUCTION

Ratchet and pawl mechanism is used in many applications effectively where the one side power transmission is required for example.

1. Giant wheel- It is the large wheel used in the amusement parks to rotate along the horizontal axis to rotate in one direction while carrying a number of passengers.
2. Clocks- where the hands rotate in clockwise directions only.
3. Baffle gates- in the entrances of many buildings which rotates about a vertical axis in one direction.

Shaping Machines – in the crank and slotted arm. In the hill station, the most common problem for the drivers is to park their cars on the slope and 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 roll back on the slope. So, the mechanism has to be developed to stop the vehicle from rolling back and it should not stop the vehicle from accelerating forwards. This function can be achieved by using the ratchet and pawl mechanism. The ratchet and pawl have to be designed and have to be fit in the front driveshaft in case of the front-drive vehicles.

2. PROBLEM STATEMENT

- Problem which we took under consideration in this project was unexpected Reverse motion of an automobile in gradients and mountain roads.
- It may occur due to the driver's carelessness or improper handling of the equipment.
- We are eager to provide a simple and economical solution for the above mentioned problem and we had done it as a small prototype for our project.

3. SCHEMATIC DIAGRAM

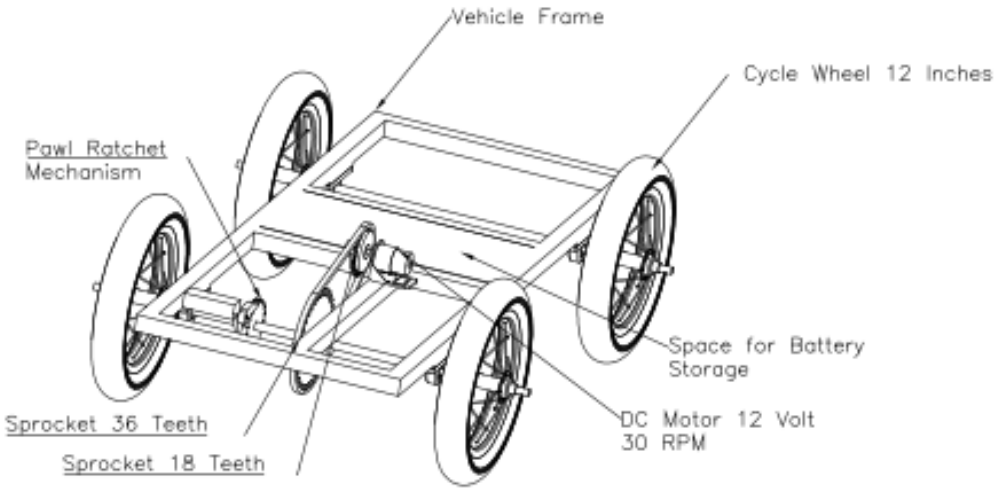

Fig.1: Schematic Diagram

4. ACTUAL SETUP DIAGRAM

Fig.2: Actual setup diagram

5. PROPOSED SYSTEM

5.1 Methodology

For design parts detail design is done and dimensions thus obtained are compared to next highest dimension which are readily available in market this simplifies the assembly as well as post production servicing work. The various tolerances on work pieces are specified in the manufacturing drawings. The process charts are prepared & passed on to the manufacturing stage. The parts are to be purchased directly are specified &selected from standard catalogues. Methodology can properly refer to the theoretical analysis of the methods appropriate to a field of study or to the body of methods and principles particular to a branch of knowledge. In this chapter, it talks about the methods used to gather information in order to finish the research. It was involving the process flow of every step-in archive the objective of this project. There are many methods use in this project such as internet references, interviewing lecturers and technicians and the most important is group discussion.

6. ADVANTAGES, LIMITATIONS & APPLICATIONS

6.1 Advantage

- Brake cost will be less.
- Free from wear adjustment.
- Less power consumption
- Less skill technicians is sufficient to operate.
- It gives simplified very operation.
- Installation is simplified very much.
- To avoid other burnable interactions viz.… (Diaphragm) is not used.

6.2 Disadvantage

- Wear between Ratchet and Pawl.
- Needs to be operated manually.
- Complicated to implement due to space limitation.
- Additional cost required for doing modification**.**

6.3 Applications

- For automobile application
- Industrial application
- Used in Clocks
- Used in Shaping Machines
- Used in Baffle gates

7. FUTURE SCOPE

The major consideration while doing this project is the safety of humans and nothing is important in front of human life. This mechanism is user-friendly. And in our market survey, we came to know that no industry is manufacturing such a mechanism for low-budget vehicles which is very shocking.

Also, the engagement-disengagement can be done by providing the sensors to the actuators which will sense the gradient roads and speed of the vehicles, and accordingly engagement will take place.

Instead of using one ratchet and one pawl, we can use four ratchets and four pawls which will take more heavy loads.

The engagement and disengagement of the Ratchet and Pawl will be done by using high-grade sensors which will automatically disengage the ratchet and pawl when the driver is willing to take the vehicle in the reverse direction.

8. CONCLUSION

A prototype of Safety Auto Brake System is designed and tested. The prototype has been developed by the integrating features of all hardware components used. Presence of every component has been reasoned out and placed carefully thus contributing to the best working of the unit. In future, the Safety Auto Brake System can be used in many vehicles to avoid collisions and accidents. Regenerative braking can be used in the vehicles and energy is saved and is stored in the batteries that can be used for further purposes. This type of braking can be used in any type of hybrid vehicles and we can reduce the use of fossil fuels.

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