

**AUTOMOBILE ANTI-REVERSE DRIVE ASSISTANCE
SYSTEM**

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report “**AUTOMOBILE ANTI-REVERSE DRIVE ASSISTANCE SYSTEM**” is a bonafide work of “**R. GOGUL and S. VENKATESH**” who carried out the project work under my supervision.

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ABSTRACT

Automobiles are now becoming the most essential part of our day-to-day life. This is the golden age for automobile companies, since they are attaining their peak selling rates in this 21st century. However with the increased production they are facing lots of problems like traffic, fuel efficiency, blends, exhaust gas analysis, etc., Among them providing a proper reverse system in an automobile is a major issue for them. With increased parking difficulties and heavy traffic problems, equipping the reverse system with more facilities is their major objective. In addition to that gliding of vehicles in gradients and mountain roads occurs often due to driver's aprosemia.

In this project, we made a simple and economical solution to the above mentioned problem. We used Ratchet and Pawl mechanism as our major capital and fabricated an equipment which can be attached to any automobile that it prevents unwanted reverse motion when it is at rest or in motion. The attachment is to be welded with the wheel rim and the pawl with a retraction spring or a lever mechanism is fabricated with the frame. Due to cost factors a small prototype of this project was done. Here we did a model with two metal wheels connected with a shaft. A rectangular frame is welded with the shaft and a lever attachment is provided in it to engage and disengage the pawl. The ratchet is welded with one of the wheels.

Key words: Ratchet and pawl mechanism, Aprosemia, Levermechaism

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INTRODUCTION

1. INTRODUCTION

The land transport sector encompasses the commercial use of many different vehicles including lorries, light vans, taxis, buses, cars construction and agricultural machinery, emergency service vehicles, motorcycles, mopeds and bicycles. Road transport safety is an important issue in the land transport sector.

Driving mistakes made by heavy goods vehicle drivers may be more serious because of the weight, size, shape, manoeuvring abilities, braking abilities, etc., of the vehicle.

The main types of transport accidents are:

- Vehicle crashes
- People being struck or run over by moving vehicles (e.g. during **REVERSING** or coupling)
- People falling from vehicles
- People struck by objects falling from vehicles, or vehicles overturning.

The analysis of European Statistics on Accidents at Work (ESAW) data reveals that 29% of fatal accidents at work are due to **loss of control** of means of transport or **handling equipment**.

Thus, improper handling and loss of control over vehicles may cause a severe threat to both the driver and the pedestrians. Unexpected reverse motion of vehicles in gradients and mountain roads is one of that problems which may cause disastrous accidents. Eventhough a modern vehicle has modern equipments like parking assistance system, hand brake, etc., driver's aprosemia will cause serious damages.

The major objective of our project is to prevent these type of accidents with some simple and economical means. It has Ratchet and pawl as its major component.

A ratchet is nothing but a mechanical device that allows continuous linear or rotary motion in only one direction while preventing motion in the opposite direction. Ratchets are widely used in machinery and tools. With this equipment we can prevent the unwanted reverse motion of a vehicle during all situations.

A ratchet wheel is to be welded with the wheel rim of the automobile and the pawl arrangement is connected to the chassis. The driver has no control over this arrangement that it automatically got engaged with the ratchet while the vehicle is driving below certain speeds. When the reverse gear is actuated, the pawl get released from the ratchet thus allowing the reverse motion. This is our project description and due to cost considerations a small prototype describing this principle was done for this purpose.

1.1. OBJECTIVES

- To prevent the unexpected reverse motion of an automobile under gradients and mountain roads.
- To protect the heavyload vehicle drivers and fellow pedestrians from disastrous accidents occurring due to loss of control and improper handling of equipment.

LITERATURE
SURVEY

2. LITERATURE SURVEY

[1] Roh J, Woojin Chung (2010)

Reversing control of a car with a trailer using a Driver Assistance System :

A passive trailer system can be used efficiently for transportation tasks.

However, backward motion control of a trailer system is difficult because it is an open loop unstable system. In our previous researches, we have shown that passive trailers can be successfully controlled by an omni-directional or a two-wheel-differential mobile robot. However, a passive trailer system pulled by a car is widely used in practical environments. Unlike mobile robots, a car-like mobile robot has nonholonomic constraints and limitation of the steering angle. In this paper, we tried to solve the backward motion control problem of the trailer system with a car by proposing two strategies.

First, we proposed Driver Assistance System (DAS). By using the DAS, a driver can control the trailer system as a forward motion control instead of a backward motion control directly. A driver only secure the rearview of the last passive trailer, and select the control input to drive the last passive trailer. The DAS converts the control input of a driver into the velocity and a steering angle of a car by inverse kinematics. The DAS can be achieved combining several electronic devices which are recently embedded in a car in general.

Second, we proposed a kinematic configuration which is connecting a passive trailer to the front bumper of a car for increasing the feasible region of backward motion control.

Performances of the proposed control strategy and the kinematic configuration are verified by theoretical verifications and experimental results.

[2] Sears Williard T (1925)

1. A ratchet and pawl mechanism comprising in combination, a ratchet wheel, an oscillating arm having a pawl thereon adapted to engage and rotate the ratchet wheel, an intermediate pawl member on the arm, an extension on the intermediate pawl member, and adjustable means engaging said extension and causing said intermediate pawl to be oscillated and oscillating the pawl out of driving engagement with the ratchet wheel at any predetermined point in the stroke of the oscillating arm.

2. A ratchet and pawl mechanism comprising in combination, a ratchet wheel, an oscillating arm having a pawl thereon adapted to engage and rotate the ratchet wheel, said pawl comprising two pivotally connected members having spring means to hold them in operative relative position, an extension on one of said members, and adjustable means engaging said extension adapted to oscillate the other member out of driving engagement with the ratchet wheel at any predetermined point in the stroke of the oscillating arm.

3. A ratchet and pawl mechanism comprising in combination, a ratchet wheel, an oscillating arm having a pawl thereon adapted to engage and rotate the ratchet wheel, said pawl comprising two pivotally connected members having spring means to hold them in operative relative position, an extension on one of said members, adjustable means engaging said extension adapted to oscillate the other member out of driving engagement with the ratchet wheel at any predetermined point in the stroke of the oscillating arm, and means to clamp the adjustable means in any desired position.

PROBLEM DEFINITION

3. PROBLEM DEFINITION

- The problem which we taken under consideration in this project was unexpected reverse motion an automobile in gradients and mountain roads.
- This problem may occur due to driver's carelessness or improper handling of the equipment.
- 'Employees who drive more than 25,000 miles a year have at least a one in 8,000 chance of dying behind the wheel of their company vehicle' (RoSPA, taken from UK Transport Research Laboratory 2008).
- 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 mini project.
- Ratchet and pawl mechanism is one of the most interesting inventions in the field of mechanical engineering found applications in various sectors.
- Here we make use of this mechanism to arrest the unexpected reverse motion of a vehicle by fabricating it with the wheel rim and attaching the pawl to the frame. The engagement and disengagement of the pawl can be done with the help of an electromagnetic switch or a lever mechanism.

DESIGN
AND
FABRICATION

4. DESIGN AND FABRICATION

4.1. MATERIALS REQUIRED

SL.NO.	MATERIAL	SPECIFICATIONS	QUANTITY
1.	Hollow Mild Steel shafts	Dia10mm	1
		Dia 12mm	1
2.	Steel bars	5mm X 5mm	6
3.	Ratchet Wheel	-	1
4.	Pawl	-	1
5.	Permanent Magnet	-	1
6.	Nuts and bolts	-	Required

4.2. EQUIPMENTS USED

- Arc welding equipment
- Portable Grinding Machine
- Drilling machine
- Hacksaw Blade
- Ball peen hammer, etc.,

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