

# REVERSE WHEEL LOCKING USING RATCHET AND PAWL MECHANISM IN AUTOMOBILE

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**Abstract :-** Safety in road is an important issue in the land sector all over the world, due to increase in the usage of automobiles in last few decades. The project consists of lockup the reverse wheel specified it'll management the reverse motion of the automobile business vehicle with the assistance Ratchet and pawl mechanism. The paper presents "REVERSE WHEEL LOCKING USING RATCHET AND PAWL MECHANISM IN AUTOMOBIE" for both light and heavy vehicle. This paper outlines system demand easier, safe and secure mechanism for the uncontrolled reverse motion of car on mountainous terrains. The movement of the Pawl will be controlled with the help of the linear actuator. A push button will be provided on gear of the vehicle which will be operated by the driver on choice. In hilly regions, there is unwanted reverse motion due to stop. Driver has to apply brake, clutch pedal for gear shifting and accelerate the vehicle forward. Due to this situation, vehicle sometimes move back. We use Ratchet and Pawl for preventing above discussed problem. Ratchet and Pawl are used our major capital and fabricated equipment which can be attach to any automobile with differential gearbox to avoid unwanted reverse motion of vehicle.

**Key Words:** Ratchet, Pawl, Differential, Reverse wheel locking, Solenoid valve.

## 1. INTRODUCTION

Ratchet and Pawl mechanism is used in much application where one sided power transmission is required or to permit shaft to rotate in one direction but not the other. They are used in many application like gain wheel, clocks, shaping machines.

In hill station, the most common problem to the driver is to park their car in the slope and to start up the car on slope while waiting in the traffic, the car have to move slowly step by step. This situation is a difficult one for the driver to make their car not to from unwanted reverse motion.

So the mechanism has to be developed to stop the vehicle from making unwanted reverse motion. To achieve their, we have prepared a model where automatic locking of the vehicle wheel against backward motion except when vehicle is not reverse gear. It automatically prevent vehicle from reverse motion and stop motion. The Ratchet and Pawl gate

engaged while motion is reverse of applied model automobile.

Model mechanism consists of Ratchet and Pawl arrangement which is mounted on rear axle of the vehicle. On the push button is provided in driver rear space, when button is pushed to the Pawl will come in engaged position with the Ratchet and will constraint the reverse motion of the vehicle. The Ratchet is mounted on the rim wherever the Pawl is fabricated on the chassis of the vehicle.

When Pawl is pivoted in such a way, driver can safety release brake pedal and move vehicle forward direction on after engagement of Ratchet and Pawl driver could just place the foot on the clutch and accelerator pedal and could have vehicle easily. Thus accident is prevented by uncontrolled reverse wheel motion. This is the overall working principle of our project.

## 2. COMPONENTS:

The main components used in design of equipment and they are:

1. Ratchet
2. Pawl
3. Solenoid valve
4. Motor for driving wheel
5. Differential gear box

### 2.1 Ratchet:

It is a mechanical component having circular profile with teeth on the circumference. The main output of ratchet is to make motion in one direction.

### 2.2 Pawl:

It is metallic part made with tip end to rest on the teeth of the ratchet and fix tip end in the gap of ratchet's to teeth.

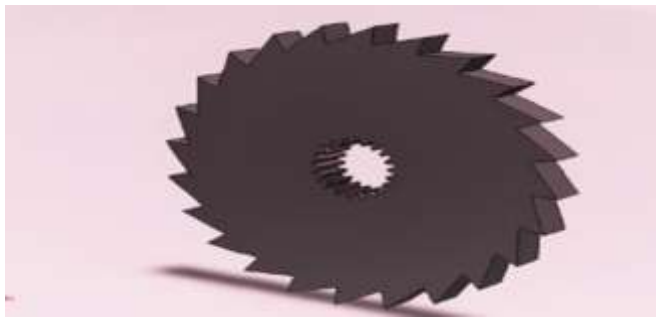


Fig -1: Ratchet

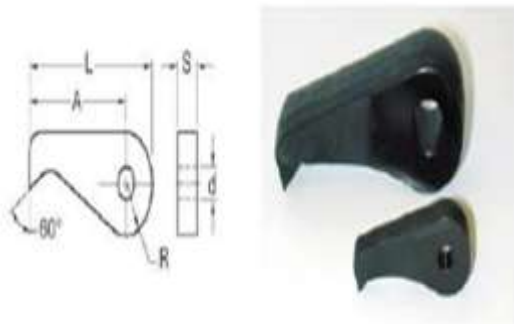


Fig -2: Pawl

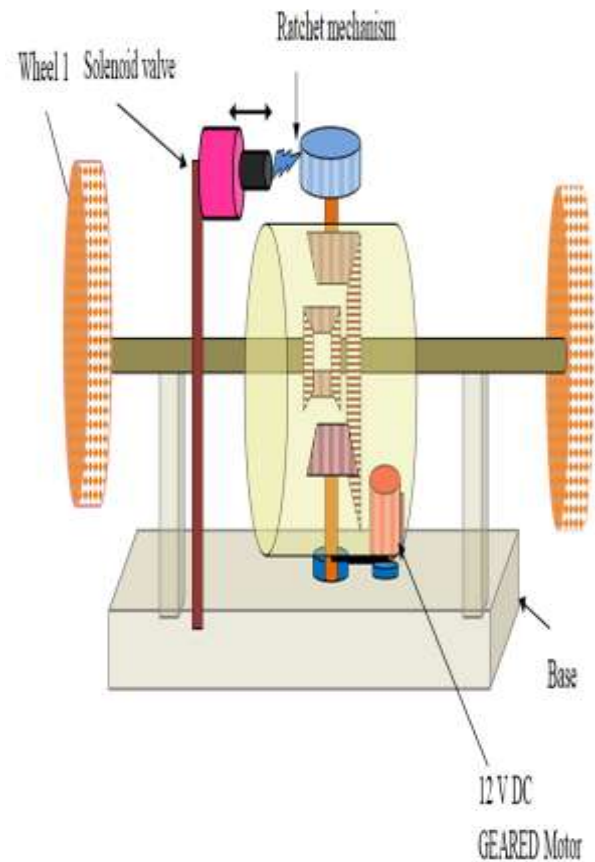


Fig -3: schematic diagram of assembly

### 3. WORKING

When normal vehicle is moving on an inclined path in a heavy traffic or it is stopped on the slope and then suddenly stopped. It tends to move backward. This can cause associate accident with the vehicle simply behind. In the normal running of the vehicle we have to perform three tasks at the same time. That is disengaging brake, releasing clutch and at the same time accelerating the car. It can prove to be difficult for novice driver. To solve this downside, we make use of the free wheel, which is attached to the differential. This freewheel is engaged with the help of hand lever and is coupled with bevel gear of the differential. The motion of differential is restricted in reverse direction. So when the vehicle is moving in the forward direction, the freewheel also move in the forward direction. But when the vehicle is moving in reverse direction, freewheel restrict the reverse motion; hence the accident can be avoided. Also freewheel doesn't have to be disengaged for the vehicle to maneuver within the forward direction. It will move in forward direction with none downside. To move in reverse direction freewheel, has to be disengaged. To ensure whenever freewheel is engaged or disengaged, a display mechanism can be used.

### 4. MATERIAL SELECTION:

The proper selection of material for the different parts of a machine is the main objective in the fabrication of machine. For a design engineer it is must that he be familiar with the effect, which the manufacturing process and heat treatment have on the properties of material. Material used is

1. Mild steel

Mild steel is used because,

1. Mild steel is readily available in market
2. It is economical to use
3. It is used in standard size
4. It has good mechanical properties i.e. it is easily machinable
5. It has high tensile strength
6. Low co-efficient of thermal expansion

### CONCLUSION:

Our project "reverse wheel locking system using ratchet and pawl mechanism" helps in avoiding the reverse motion of the vehicle on the inclined road. Since no complex structure is used in our design, it can be easily use by novice drivers. Thus the implementation of ratchet and pawl on free wheel can stop the vehicle from unwanted reverse motion in

hill roads. This would be more helpful in hilly roads 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.

#### **FUTURE SCOPE:**

1) The modification that can be done in this project are:- With the advancement in material technology, the design strength should be so given that the mechanism can work for longer period of time without failure.

2) A sensor can be put in car to sense the inclination of the road. If it sense an inclination (which is more than desire) it will engaged freewheel automatically. The authors can acknowledge any person/authorities in this section. This is not mandatory.

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