

FOUR WHEEL THREE MODE STEERING SYSTEM

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Abstract: The most conventional and general steering arrangement is to turn the front wheels using a hand-operated steering wheel which is positioned in front of the driver. The four wheel three mode steering system is a modification for the present steering which is used for the improvement of easiness for vehicle handling.

The four wheel three mode steering system assists driver by controlling the steering angle of vehicle's four wheels as the requirement of driver, for making the parking and handling at congested areas easier. For meeting the application the rear wheels steer in the opposite direction or in the same direction of the front wheels, allowing reduced turning radius or sliding of vehicle to sideways. If we are able to transmit the motion that is given on steering wheel to the rear wheels and able to control like front wheels as our requirements, which is the basic idea of our project four wheel three mode

In convertible four wheel steering with three mode operation three steering modes can be changed as needed which assists in parking at heavy traffic conditions, when negotiating areas where short turning radius is needed and in off road Driving.

1. Introduction

Nowadays, the condition of increasing road traffic makes the handling of vehicles more difficult. The present scenario demands an exploration of new vehicle handling mechanism, which in turn forces us to find out an alternative way instead of current system or a modified steering mechanism for better handling. While the vehicle enters a congested or narrow area there would be no one who doesn't wish for, if they would be able to reduce the turning radius of their vehicle or if they could move the whole vehicle sideways without turning the vehicle. Here, comes the application of Four Wheel Three Mode which provides the same by steering the rear wheels too as our requirement.

It should not be confused with four-wheel drive in which all four wheels of a vehicle are powered. With the help of this system, the rear wheels also can be turned with respect to the direction of front wheels whenever required. Thus, the vehicle can be controlled more effectively especially during cornering, parking or when we get into a congested/narrow area.

This system finds application mainly in off-highway vehicles such as forklifts, agricultural and construction equipment and mining machineries. It is also useful in passenger cars, mainly SUVs. When both the front and rear wheels steer toward the same direction, they are said to be in-phase and this produces a kind of sideways movement of the car

Other arrangements are sometimes found on different types of vehicles, for example, a tiller or rear-wheel steering. Tracked vehicles such as tanks usually employ differential steering that is, the tracks are made to move at different speeds or even in opposite directions to bring about a change of course.

COMPONENTS AND DESCRIPTION

- Bevel gear
- Rack and Pinion
- Spur Gear
- Lever
- Screw rod

WORKING PRINCIPLE

1st MODE OPERATION

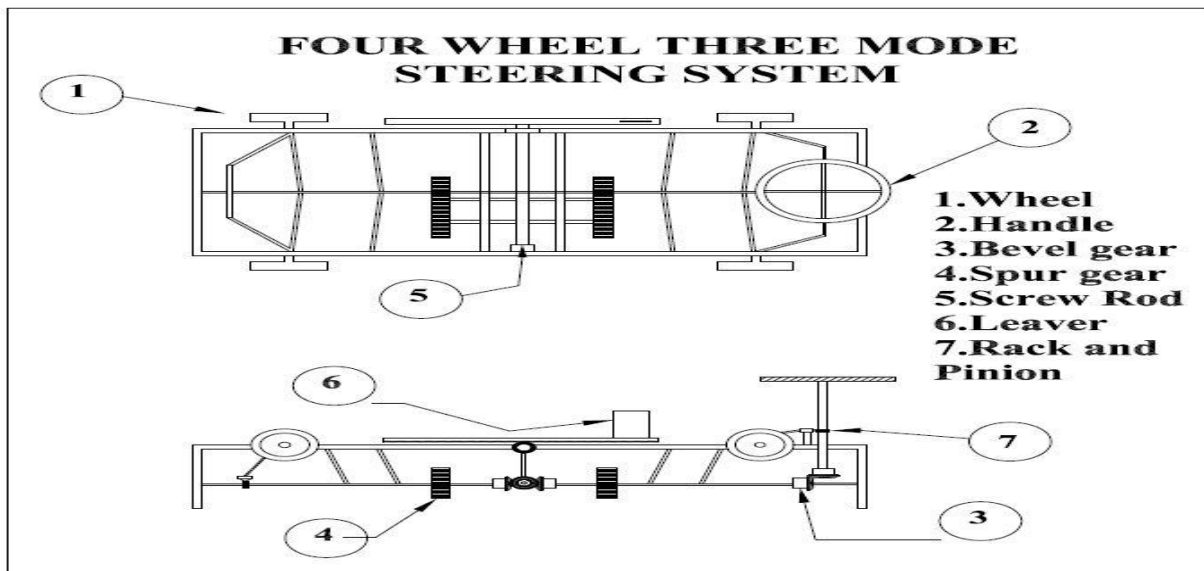
When the lever is in starting position, the steering operation is carried out in normal condition.

2nd MODE OPERATION

When the lever is in middle position, the other two modes can be used. When the gear arrangement is pushed to one position, the bevel gears get engaged and the steering of rear wheel is ensured and is in same direction as that of the front wheels.

3rd MODE OPERATIONS

When the lever is in end position, the bevel gear disengages and the bevel gear gets engaged. Due to spur gear arrangement, the rear wheel steers in opposite direction to the front wheel. This results in third mode steering. Three steering modes can be changed as needed which assists in parking at heavy traffic conditions, when negotiating areas where short turning radius is needed and in off road Driving.



ADVANTAGES AND DISADVANTAGES

ADVANTAGES

1. Easy maintenance.
2. Mode change is easy.
3. Implementation is easy.
4. Easy handling in all parking situations.

DISADVANTAGES

1. It will increase the total cost of the vehicle almost by 25000 on mass production.
2. Suspensions in rear wheels demands considerable changes for proper working of the vehicle with varying load.

APPLICATIONS

1. Used for easy parking in four wheelers.
2. It is applicable for all four wheeler vehicles.

CONCLUSION

The concepts involved in our project is entirely different that a single unit is used to various purposes, which is not developed by any of other team members. The project carried out by us made an impressing task in the field of automobile industries. It is very usefully for driver while driving the vehicle. This project has also reduced the cost involved in the concern. Project has been designed to perform the entire requirement task which has also been provided. By doing this project we gained the knowledge of various mechanism, drives, fabrication with welding and how it can be effectively used to control the steering for light motor vehicle.

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