How Does Rack and Pinion Steering Work?

Rack and pinion steering works by using a gear system to translate the steering wheel's circular motion into the linear motion needed to turn the wheels. A metal tube houses the gearset. The tube has openings on each end to allow the rack to attach to an axial rod. The pinion gear connects to the steering shaft so that the gear will spin and move the rack when the steering wheel turns. The axial rods connect to a tie rod end, which attaches to the spindle. When you turn the steering wheel, the gear spins, moving the rack. The tie rod at each end of the rack connects to the steering arm on the spindle.

The rack and pinion gear set has two main functions:

* Conversion of the steering wheel's rotational motion into the linear motion needed for the vehicle's wheels to turn
* Reduction of gears, which makes it easier for the steering wheel to turn the wheels

APPLICATIONS

Car Steering: The system works by converting a revolving motion into linear motion. Most cars, small trucks, and SUVs come equipped with a rack and pinion system.

**Railways**: Rack railways are mountain railways that use a rack built into the center of the track and a pinion on their locomotives.

**Stairlifts**: Virtually all stairlifts contain a rack and pinion gear, with the gear allowing for upward movement