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ZERO DEGREE ROTATING MECHANISM

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Abstract: **The aim of this project is to develop another solution for steering system. Nowadays, key features of a car such as the ability to steer and grip have become major features. Standard steering includes Ackerman or Davis' steering system which has significant disadvantages because it cannot take the slightest curve. Providing zero steering without compromising on car management and handling is a major concern for car manufacturers. The main goal is to improve the ability to direct zero to zero without the problems of wheel rotation. To overcome traffic congestion on the sidewalks and during parking the system is proposed. Zero Turn steering provides the ability to have smooth turning experience.**

We have developed a new concept about zero-directional design to use a method that can take a small radius to rotate in its axis of gravitational force. Zero turn is done by turning the wheels in clockwise and anticlockwise manner and revolving in opposite direction, the cars turning the radius of the circle are greatly reduced. The Zero car system is used in a jeep, in their system they use a sophisticated engine-assisted approach, for which reason the steering system was very complex. . This is achieved by using a compressor. In this process the wheels are tilted to the required position and then turned to where required. Our equipment has been found to be capable of turning the car in any direction without direction and has a rotating radius equal to the length of the car itself.

As the car rotates 360 degrees so it is very helpful to turn the car into a narrow space. Hence, this project is very useful nowadays. This program can be helpful in solving parking problems in public places, supermarkets, more places, better parking spaces, traffic jams, turning back the narrow streets, etc..

I. INTRODUCTION

The concept of steering wheel with zero turning is new to concept in steering mechanism. The first production of zero dergee turning on average, an American car buyer was introduced 20 years ago. In 1988, the system was completely independent, automated and mechanical: no electrical equipment, no speed sensor, no computers, no hydraulic, just two racks and a stick between them.

Zero-wheel steering is also known as the all wheels steering. The 4ws system improves handling and assists the car when turning slightly. The front wheel does a real steering job. The rear wheel rotates usually with a 90 degree limit during reverse rotation. At the same time the rotation of the rear wheels is limited to about 1 degree to 1.5 degree. n a 4ws system, the front and rear wheel steering wheel is one side of the so-called high speed, while the front and rear wheel rotates on the other at a speed called anti phase or reverse phase and is produced by sharp turns and sharp turns. This happens by connecting the steering wheel to the steering wheel and the wheels. The steering system can be manually or powerfully. When the power source of the steering system is strong, the steering wheel operates on the steering wheel, then the car has manual steering. Power used by a hydraulic pump or motor to assist the steering effect. Nowadays most cars are made with an electric steering machine.

Performance is the same for both manual and manual steering. As the steering wheel turns the steering wheel where it moves to the steering gear. The line movement works by connecting the steering wheel / strap attached to the arms of the steering wheel. The steering knob then turns the wheel to the left or right side.

Zero-wheel steering, 4WS, also called rear wheel steering or all-wheel drive, provides a way to steer the rear wheels during rotation. It improves handling and helps the car turn more. A car built for production tends to go down or, in a few cases, over steering. If the vehicle can automatically compensate for the under steer / over steer problem, the

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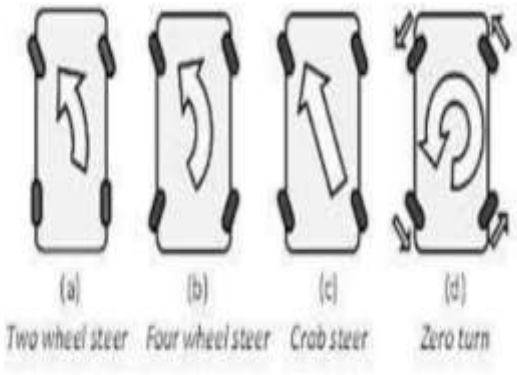
steering wheel can enjoy moderate steering under a variety of conditions. The actual wheel rotation is usually limited to halfway through the opposite turn. When the front and rear steering wheels are facing the same direction, they are in phase and this produces a kind of car movement on the sides at low speeds. When the front and rear wheels are directed in a different direction, this is called anti phase, counter phase or Phase Phase and produces sharp, strong curves. Elsewhere on this site you can learn about all the other things that make a car move and stop, so this page is where you will learn how to move around corners.

Like most things in a car, the concept of a simple steering wheel turns the steering wheel, the front wheels turn, and the car changes direction. How it happens but not so easy. Well it used to be back in the days when cars were called horse-drawn carriages, but today, not so much.

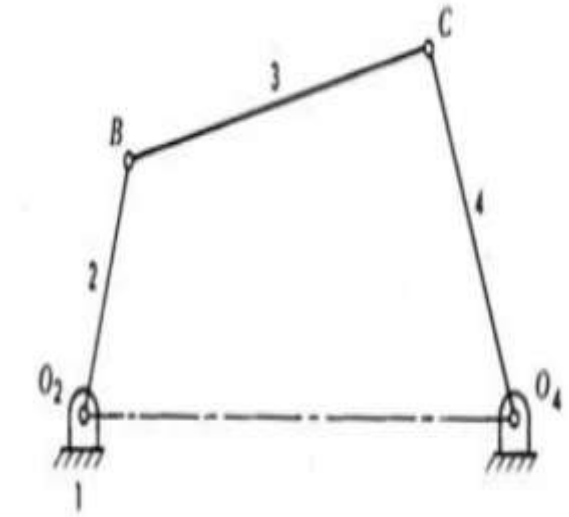


Steering wheel configuration

II. METHODOLOGY

The connection of the four bars is also known as simple easy-to-move removable connections. It consists of four bodies called connectors connected to the loop by four joints. Normally the joints are adjusted so the link travels with the corresponding plane and the joint is called planer four bar linkage.

One of the most useful and common ways to connect four bars. In this machine a link that cannot be fully rotated is known as a crank. The connector that makes the oscillates known as the lever and the connector that connects the two is known as the coupler. The basic link is known as the framework.



Four bar chain

III. FINDING & RESULTS

Schwab [2014]: Balance and control of the rear bike with speed steering wheel. This shows that one can design a bicycle with rear wheels that shows that the speed is steady and stable. It is shown that the guide torque of the rider stays with it at the human limit.

Or: Different control of the Autonomous mobile robot. This includes the study of both DC motors speed with and without control of pulse width fluctuations in DC motors that control the speed of the portable robot wheels.

Hsien-Yu: A study of the axle's four-wheel drive electric power train. Functions include a machine and design of a small AMT clutch, a suitable design for the transmission gear and finally a 4wd power separation strategy design.

K Lohith [2013]: Development of a 4-wheel drive steering system. The main purpose of this program is to remove the rear wheels from the section to the front wheels.

Pushkin Gautham [2015]: Special of all ATV steering wheels. In this case, the involvement and termination of 4 wheel steering can be done according to the need of the driver.

Other literature survey are as follows:

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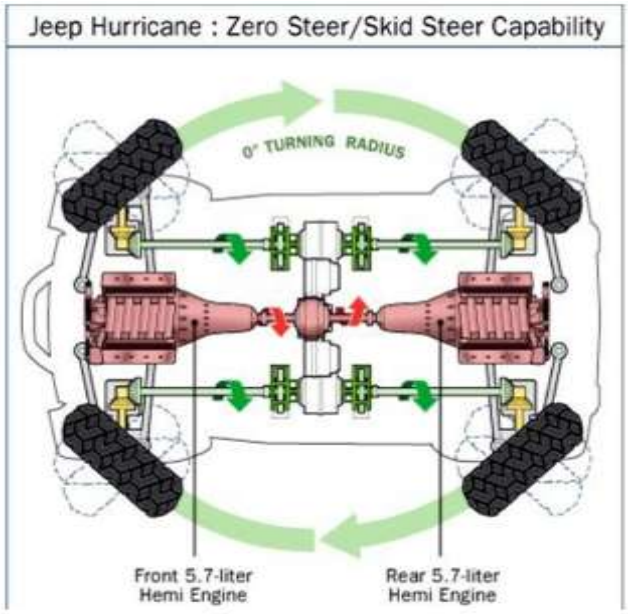
JEEP HURRICANE:



Zero Steer

The multi-wheel-drive Jeep Hurricane uses a four-wheeled steering wheel. Each wheel can turn independently from the other. The car has two types of four-wheel drive. In the first mode the front and rear tires are rotating and reducing rotation. In the second mode, the front and rear wheels turn in the same direction as the crab direction, which helps to park in a small area without changing direction .The jeep can rotate around, as shown in the picture. Jeep Storm is limited as required by a skilled pilot, a sophisticated steering system that wears a tire

With more than 14 inches (36 cm) of ground clearance and 20 inches (51 cm) of fixed distance, this Storm is at its peak when it comes to off-road power. As Zetsche pointed out at the 2005 Detroit Car Exhibition, "To put it bluntly, the clearance is 5 inches high and its specification is almost three times that of our Jeep production vehicle."

The suspension system with four short wheels / long arms is influenced by the shock of the distant water coil (this allows for longer travel when in shock). The 20 inch wheels that hold the tires off the road are specially designed 37 inch long. Chrysler reports proximity angle of 64 degrees and departure angle of 86.7 degrees.

The storm is more than just a Super Jeep. It also represents the Chrysler engineers' attempt to combine excess (with two HEMI engines) and responsibility (new technology allows Storm to operate in just a few four cylinders).

Storm management system is a marvel of engineering alone. There are many types of steering wheel that use a four-wheel-drive steering wheel. That means each wheel can rotate separately.

In a standard steering wheel the rear wheels rotate in the opposite direction, which is the front wheel which strengthens the radius and creates an accurate steering wheel. In the another phase, the rear wheels rolls similar to front wheels, which means that the Storm can "direct the crab" - to the side without changing direction. The third mode, which uses the "T-Box Zero Steer" machine, allows all wheels to "enter" and change the steering wheel on each wheel to rotate. The result? The Jeep Hurricane has a wide range. A hurricane could roam the area. Chrysler engineers are determined to make the best off-road vehicle. Although there will be no production Storms, they form a fully functional prototype, and Chrysler acquired several patents while creating Storm.

TATA PIXEL:

The Tata Pixel is based on the Nano Europa concept that was first shown at the 2009 Geneva car show. In the European sense, the Nano was developed to meet the safety and Emission standards in the EU, this concept has been much more advanced than the standard Nano, which includes an extended wheelbase, a new 3-cylinder engine, power steering, anti -lock braking system (ABS), advanced interior and exterior and heavier than standard Nano.

The Tata Pixel is able to move and park in tight spaces due to zero turn to roid traction-drive, Infinitely Variable Transmission (IVT), and due to its design control system. This causes a rotating radius of 2.6 meters. The steering wheel and gearbox work together so that each wheel can drive independently and the inputs from the steering wheel. By inserting a reverse drive on one rear wheel and a forward drive on one rear wheel, the car is able to turn about its length. The Tata Pixel has a start-up hybrid and a refreshing braking system, with a fuel-efficient diesel engine. It produces CO2 emissions of 89 gm / km and saves a combined 1 liter / 100 km fuel cycle.

The Tata Pixel has a monographic ceiling, a silver-plated window sill and a sweeping roof line. It also has 2 base doors for easy access and visibility.

Figure 2.2 Tata Pixel

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IV. ELEMENTS AND CONSTRUCTION

Wheels-
The wheel is the circular part intended to rotate the axle bear. It is one of the main components of a wheel and axle which is one of the six simple machines. The wheels, in conjunction with the axles, allow the heavy objects to move more easily and to be easily moved or transported while supporting a load, or to operate on machinery.

Dc motor drive-
A DC motor has any phase of rotating electric motors that convert current electrical energy into mechanical power. In most cases it depends on the energy produced by the magnetic field. In particular all types of DC motors have a specific internal mechanism, be it electromechanical or electronic.

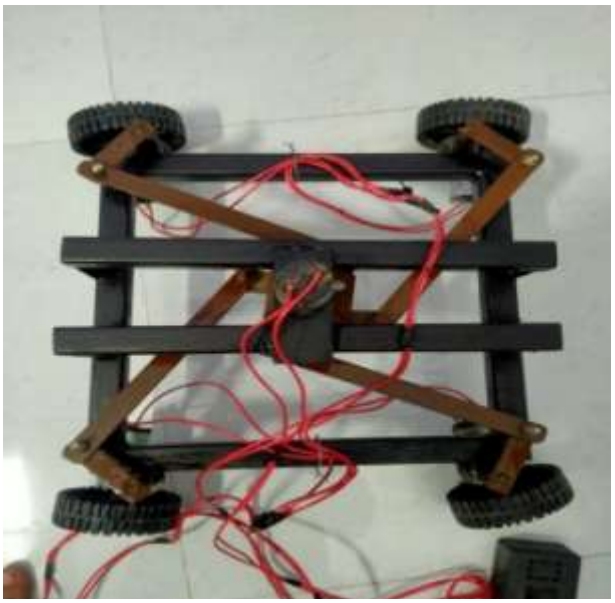
Shaft-
It is a rotating part usually of circular cross section used for transmitting energy The shaft is supported by bearings and rotates a set of gears or pulleys for power transmission. The shaft is usually made by bending moment, torsion and axial force.

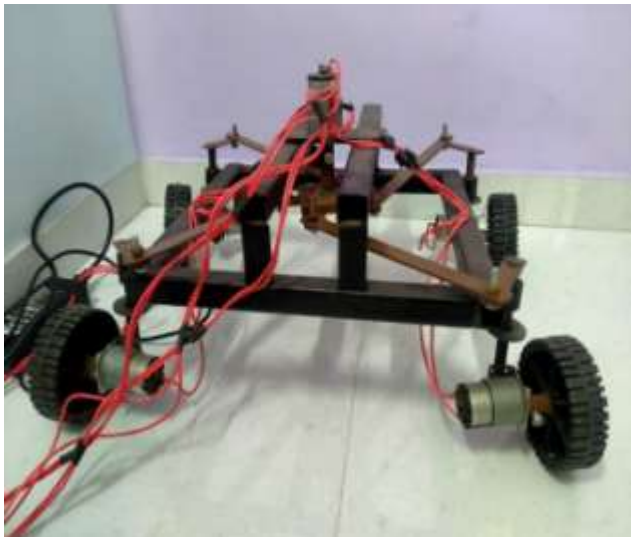
Bush for axel-
Typically, a tree used as a supporting element for gears, sprockets, shaft A bushing, also known as a tree, is an independent plain that is inserted indoors to provide a place for installation for rotation.

Motor Mounter plate-
Motor Mounts are an integral part of any car. Race cars can give up vibrations to gain power by using a sturdy metal plate ,plate to mount the engine. This is a very powerful solution for locating the engine and keeping it steady.
bearing mounter plate.

Working-
A zero turning car means a car that turns a sharp curve with a zero speed and follows a straight circle without leaving a straight axis passing through the center.
We used a machine in which the motor in the center turns the wheels in each corner so that some turn clockwise and some turn clockwise, and after turning the wheels the wheel of each wheel turns in such a way that some wheels revolve in clockwise and some revolve clockwise. our goal of zero degree turing is achieved

Fabricated Model-





V. CONCLUSION-

As it is powered by a battery, a small, environmentally friendly car has been introduced cars turning a circle that can be greatly reduced .problems such as traffic on narrow roads and on time parking becomes easier. This program reduces parking once time to change. We can achieve zero turn without further ado compromise on the ability to direct and control the vehicle.

VI. REFRENCES-

[1]. Internet: global automotive engineering online, Delphi Automotive program
[2]. Joseph heitner Automotive mechanic, CBS publisher and distributor

[3]. Narang GBS automotive engineer S.Chand And Company Limited
[4]. Design a PSG college of technology developer data booklet published by kalaikathirachchagam
[5]. S.Rattan Khanna printing press theory
[6]. Thomos D Gillespie who is the foundation of the automotive evolving automotive engineering community
[7]. Hiroshi Ohmura is a real wheel steering device for Mazda motors Co. US Patent no. 4953648
[8]. Madras Technical Center

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