360 degrees rotating vehicle (Revolutionizing Mobility)

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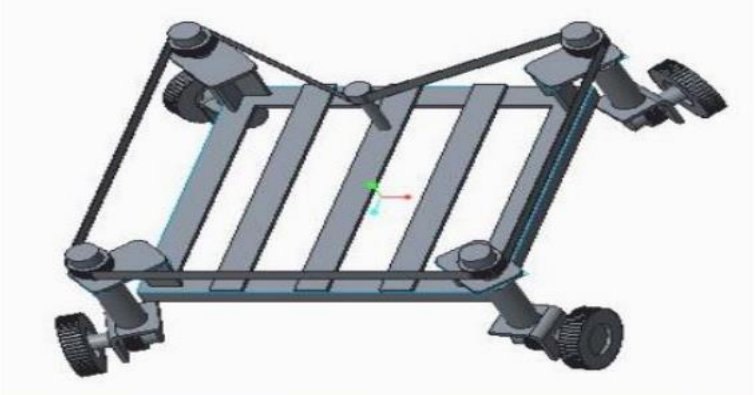
Abstract: **This project is about the 360-degree rotating vehicle. This vehicle moves in all directions and this design provides better comfort and also save the time, most of the peoples uses this vehicle to carry goods (courier), emergency for patients etc. The normal wheel vehicle faces lot of problems likes parking, U turns and much more which consume more time. So, we have designed 360-degrees rotating vehicle to reduce and eliminate problem in the industries as well as common life of peoples. The vehicle takes a turn without moving the vehicle. No extra space is needed to turn the vehicle. In this system, each of the 4 wheels given drive with DC motors, so it can rotate 360 degrees. 360-degree rotating wheel is controlled by RF remote. we use this 360-degrees rotating vehicle from various perspective in transport things and furthermore in vehicle, 8which will help in decreasing rush hours grid lock and spare times. The aim of this project is to foster a zero turning vehicles. Rather than working by a gear framework, we are involved automatic framework for activity of this4 wheel vehicle. Supplanting 2wheel drives by four wheel drives make more advantage for the vehicles to proceed. Traditional controlling include either the Ackerman (or) Davis directing framework which has significant weakness that it cannot take least sweep turns. We attempt to take a care of the issue of turning space by new idea of zero's turning vehicle with mechanical linkage and automatic shifting. The primary reason for this venture is to less the turning sweep and turning space at same spot without leaving its focal point of gravity. In this framework, the wheels associated with the front axle are gone inverse to each others, as are the wheels associated with the back hub. The wheels on the one left half vehicle pivot in one bearing and the other one on the right 50% of this vehicle. To conquer issue like vehicle moving on tight roads. This framework is very useful in such cases.**

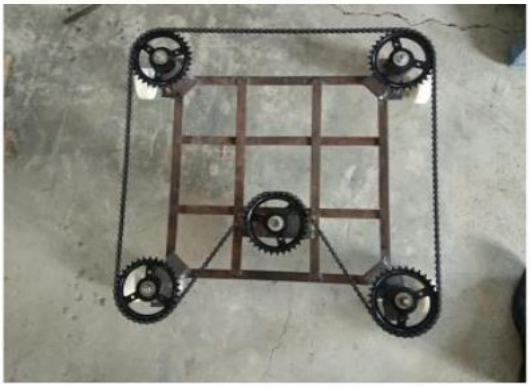
INTRODUCTION

This project is about plan a 360 degree wheels turning vehicles. This vehicle moves in every which way and this plan gives better furthermore spares the season of client, the vast majority of this general population utilize this vehicle to convey the product, understanding and soon. In any case, more often than not, they need to confront the issue like taking U-turns and parking vehicles. So we need to create a 360 degree wheel turning vehicle to lessen and dispose this issue in the business and at the railway road stage. This structure will give better and furthermore spares the season of client, that is the reason it is additionally the dependable for the clients. As it is in likewise battery work vehicle consequently no fuel required. It is affordable to the humans. Zero degree turning space of a vehicle suggest the vehicle pivoting around the hub going through the focal point of the gravity of a vehicle for example the vehicle turning at a same spot, where it is stand. No additional space room is required to turn the vehicle. vehicle is to be turned in the same space equal to the length of the vehicle. In this framework, controlling is associated with sprocket and this sprocket is associated with the sprocket of front wheel by a chain drive. Guiding is utilized to give course of front wheel. The DC engine is associated with the sprocket jolt at above of casing. At the point when control supply from battery to the DC engine then revolve movement exchange from DC engine to wheel. The heading are gives beneath sprocket which will permit to wheel turn 360 degree about vertical pivot. At that a point this equivalent rotating movements is exchange to the back wheels by sprockets and chain drive courses of action. So according to this game plan of the vehicle wheels to turn 360 degrees directly from unique position, however front wheels of this vehicle pivot 360 degree by controlling, sprocket and chain drives games plan. This plan will give better solace and furthermore saves the hour of clients that is the reason it is additionally the dependable for the client. As it is

additionally battery is worked vehicle hence no fuel is needed. And hence it is affordable to the climate The working process of a traditional large-scale CAES plant is described as follows. During the compression mode the surplus electricity is used to run a chain of compressors to inject the air into a storage reservoir, normally an underground cavern for large-scale CAES. The compressed air is stored at a high pressure and at the temperature of the surrounding formation. Such a compression process can use coolers to reduce the working temperature of the injected air and thus to improve the compression efficiency. During the expansion mode, the stored high pressure compressed air is released, heated, and then expanded through a group of turbines which includes gas turbines(s) and sometimes steam turbine(s). The combustion process in the gas turbine with mixed compressed air and fuel (typically natural gas) occurs in the combustion chamber of turbine(s). The turbines are connected to an electrical generator to generate electricity. The waste heat of the overall system exhaust can be recycled before it is released into the atmosphere. The main feature of conventional large-scale CAES plants is that they involve combusting fossil fuels via gas turbines, resulting in CO_2 emissions.

With the development of technology, several improvements and advanced concepts to large-scale CAES have been proposed. Among these concepts, the most promising CAES scheme is Advanced Adiabatic CAES (AA-CAES). Wheen the AA-CAES system is operated at the expansion mode, by integrating a Thermal Energy Storage (TES) system, the energy stored in the compressed air is converted into the electrical power output without a combustion process involved (Fig 2). Thus, the significant benefit of AA-CAES systems is zero carbon emissions, assuming that the electricity for the compression mode is also from zero carbon energy sources. The processes of cooling airflow through compressors and the heating of input airflow to each turbine are completed by using the heat exchangers. Theoretically, the overall roundtrip efficiency of AA-CAES is higher than that of the conventional CAES technology because AA-CAES system reuses the heat generated from the compression.





But most of this time, they face the problem like taking U turns, parking, moves in narrow road etc. we design this 360 degrees wheels rotating vehicle to reduce time and eliminate the problems in the industry and also in railway platforms. Zero degrees turning radius of a vehicle improve the vehicle rotating about an axis

passing through the center of the gravity of vehicle i.e. the vehicle turning at the same place, where it is standing. Hence no extra space is required to turn this vehicle. So vehicle is to be turned in the space equal to length of the vehicle itself. In this system, steering is connected to sprocket and this sprocket is connected to front wheel by a chain drive. Steering is used to direction of front wheel. The DC motor is connected to sprocket bolt at above of the frame. When power supply from battery to DC motor then rotary motion transfer from DC motor to wheel. The bearings are provided below the sprocket which allows to the wheel rotation 360 degree about the vertical axis. Then this same rotary motion is transfer to the rear wheel by the sprocket and the chain drives. So as a result this vehicle wheels to turn 360 degrees from its original position, and front wheels of this vehicle rotate 360 degree by steering, sprocket and chain drives arrangement. Without moving from the spot, i.e. the vehicle has zero turning radius. This helps in maneuvering the vehicle in tight spaces such as parking lots and within small compounds. The various functions of the steering wheel are to control the angular motion the wheels, direction of motion of the vehicle, to provide directional stability of the vehicle while going straight ahead, to the facilitate straight ahead condition of vehicle after completing the turn, the road irregularities surface must be damped to the maximum possible extent.

Working Principle:

In this project battery is provided to power supply to the control unit. The equipment contain total Five motors, four motors are connected by a chain to the main DC motor for to turn the vehicle. The four motors are used to run the vehicle. The DC motor is used to turn the vehicle in any angle to give the side for the back side vehicles. Keypad have six keys they are right, left, forward, reverse, park left side, and also park right side. We press the left key in the keypad the vehicle turns left side in a required angle, we press the right key in the keypad the vehicle turns to right side in a required angle, similarly the forward and reverse motion of the vehicle are control by the forward and reverse keys in the keypad. We want to park the vehicle in left side by press the park left key then the motor connected in the chain drives is turn the wheel left side 360 degree automatically, then the vehicle is parked in the left side, this process is same as to right side. Using this we can easily park the vehicle in various places.

Aim of the project:

The aim of this project is to develop a zero turning vehicle. Instead of operating a gear system, we are using two configuration system for operation of this vehicle. There crab steering and zero turn to Replacing 2wheel drive by 4wheel drive makes more convenient to the vehicle to take turn. Conventional steering involves either the Ackerman or Davis steering system which has major disadvantage that it cannot take minimum radius turn. We try to solve this problem of turning radius by new concept of zero turn vehicle with mechanical linkages. The main purpose of the project is to reduce the turning radius and turning space by rotation at same place without leaving its center of the gravity. In this system, the wheels connected to the front axles are turned opposite to each other, and so are the wheels connect to the rear axle. The wheels is rotate my motors placed in four edges of the vehicle. The vehicle take a diversion my using DC motor which is connected to the battery.

Objectives:

*In this vehicle, the wheels of the car is turn 360 degree angle.

* To overcome in parking difficulty.

*To turn the vehicle with no leaving its center of the gravity.

* It can take turns without moving the vehicle, and extra space is not required to turn this vehicle.

Problem identification:

Most often they need to deal with the issue of short parking place, taking more time to park a vehicle or to take risky U-turn and so on. In that case, 360-degrees rotating vehicles is the solution to park as many cars as possible in small and tight parking space with a short amount of time as this vehicles is capable of moving through in directions with respect to vertical axis. progressive development of modern technology has bring about the increment of four vehicles on streets in large scale. Besides, due to rapid increase of financial stability, a large number of people use their personal vehicle in their routine life.

The design and fabrication of 360 degrees wheel rotation vehicles using DC motor and steering is done to reduce time to turn the vehicle from one direction to other direction. This vehicle can move in all directions at same position by used of steering, sprocket, DC motor, chain drives and bearings. Main aim of this vehicle is easy to move from one direction to other direction. Present study aims for the development of this system to reduce the turning radius of vehicles. In this system at first vehicle is stopped and wheels are then turn to required direction with help of steering system and finally DC motor. It has turning radius nearly equal to negligible of its length of the vehicle itself. This vehicle used to carry the goods in various areas such as, railway platform, hospitals, industries and markets. Modern developments and economical progressions of Indian society result in increase of peoples on railway platform, increases of vehicles on the roads, Due to space constraint, in hospitals face the major problems while parking vehicles.

FABRICATION PROCESS:

*Fabrication of the frame structure.
*Fabrication of the backets of motors.
*Mounting the wheels on the axle by interference fit.
*Mounting and aligning the simplex chain to all four sprockets.
*Inserting the cotter pin to four sprockets.
*Fixing the runner wheel on the motor shaft.
*Mounting the battery on the frame.
*Fixing the remote.
*Check for proper wiring connection.

Literature review

This project consists of steering, chain sprockets, DC motor, wheels, bearings, iron pipes, battery and chain drives. In this system first the vehicle is stop and wheels are then turned in the require direction with help of steering system and DC motor. Teeth of sprockets are completely join with chain drive which has used to provide rotary motion to rear wheels by help of DC motor. Steering is used to provide direction for the vehicle to front wheels by help of sprockets and chain drive arrangements. DC motors are used in each wheel to provide forward and also backward movement of the vehicle, and also a battery is used to provide electrical energy of each DC motors. It has turning radius equal to negligible of length of vehicle itself. This system is to be useful in hospitals, industries and also on railway platform. 360degree wheel rotation vehicles consist of steering, chain sprockets, chain drives, iron pipes, battery, DC-motor and wheels. In this vehicle sprockets of front wheels and sprockets of steering are connected by first chains drive and sprocket of rear wheels connected to second chain drives and DC motor has is given to each wheels to provide forward and also backward movement for the vehicles. When steering is to rotate clockwise and anticlockwise directions by hand then sprockets is connected with steering also rotate clockwise and anticlockwise directions. This rotary motion transfer to front wheels by chain drive because teeth of the sprocket and chain drive are completely mesh with each other. Bearing is provided with sprockets which allows the wheels to rotate 360degree. So as a results front wheels of this vehicle rotates in 360degrees direction by steering at same position. When power is supplied from the battery to DC motors then DC motors starts to rotate in clockwise directions and also sprockets will rotate in clockwise direction because sprocket bolt is connected to DC motor, the same rotary force is transferred to other rear wheels by chain drive because sprocket of rear wheel are connected by chain drive and bearing has provide with sprocket which allow to wheel rotate. So as a results rear wheels also rotate 90degrees left from original position and reverse current flow from battery to DC motor then rear wheels rotate 90degree right from original position. When power supply from battery to DC motors of each wheel then each DC motor starts rotate than wheels also rotate with DC motors because wheels and DC motors are connected by bolt and nuts.

As a results vehicle move in forward direction and when reverse current flow from battery to DC motor, then DC motor start rotate in opposite direction. As a results vehicle is move in back direction.

Methodology:

To starts this project, a meeting with guide in the first week is done to manage the schedule of weekly meeting. The purpose is to inform the guide on the progress of the project and guided by the guide to solve difficult. Briefing base on the introduction and next task of project is given by the guide. Make a research of literature review with the mean of the internets, books, available published articles and materials that is related to the titles. Designing phase start of by sketching few models using manuals sketch on A4 paper. Do it comparison for choose the best concept. Software applications are downloaded from internet to design the models based on the sketches. Software parametric 2.0 help to draw the better dimensions. The preparation of mid-presentations of the project is next. Before presenting, the guide will see through the slide presentation and comment on correction to be made. Then, presentation on the knowledge attained and instilled in the design phase is presented to a panel of three judges. Following up, is the fabrication of make some method for this project. Choose the material, make some list for the material and dimension. Doing it planning of fabrication process for this project. After that, start the fabrication processes. It would take seven weeks to get this designs and fabrication processes alteration done. Make some analysis and testing for the projects. Do it correction for error this project. Finish the fabrication process with painting processes. After that, the final report writing and final presentation will be the last to be accomplished. The guide will review the final presentation and revise mistake to be amended. The final presentation then again will be presented to three panel. A draft report would then be submitted to the guide to be point out the flaws.

Steering, Sprocket, Chain drive, Wheel, Iron pipe, DC motor, Bearing, Fixed frame, Battery

*Steering :- Steering is a element of 360 degree wheel revolving vehicle. This element is used to supply the way to the front wheels by help out sprocket and chain drive, which provides path to the front wheels clockwise or anticlockwise direction.

*DC motor: - During this vehicle one DC engine are give in each wheel to go ahead and reverse way. The detail of engine utilized is 12 V, with 60 rpm. / When power gracefully from battery to DC engine then DC engine turn clockwise way and when switch current flexibly from battery to DC engine then DC engine will anticlockwise course. Which will advance and in reverse development of car.

*Wheels:- In this vehicle wheels are made of plastic material. Wheels are interface with DC engine and front wheel turn 360degree by help of controlling, chain sprocket, chain drives and bearing game plan. The back wheels turn 90degree left and 90degree directly from unique situation by help of DC engine, sprocket and chain driver course of action, DC engine has given to each wheel to flexibly advance and in reverse development of wheel.

*Iron pipe:- It is a one of significant pieces of 360degrees wheel pivot vehicle. It is made of mellow steel. Which is utilized to join bearing and DC engine of each wheel.

*Sprockets:- A sprockets is a profiled wheel with teeth, gear-teeth, or even sprockets that work with a chain. The sprockets are utilized for the power transmission among controlling and wheel through the roller chain drive Chain sprocket is a section this vehicle. Chain sprockets are utilized to gracefully the clockwise or anticlockwise heading to front haggle wheel through the chain drive.

*Battery: - Battery is one of the significant pieces of 360degree wheel pivot vehicle. Which is associated with DC engine by electric wire. It is store electrical vitality and gracefully to DC motor so vehicle will push ahead and reverse way. Batteries work by charging.

*The steering motor configuration includes; voltage - 9v, speed – 1500 rpm, power – 55 w.

*Switches for both the steering motor will be in the hands of the driver so he can rotate the rear tires to the prescribed rotation angle.

*For front tires, a rack and pinion arrangement used for rotation of the tire.

*The rotation of the outer tires as they have to cover a larger distance as compared to the inner tire. Power or simple Steering could be used as per the needs of the drivers.

*The drive to the vehicle is provided by a dc series motor. The configuration includes; voltage-24v, speed-1500 rpm and power- 160 w.

Components name and dimensions:

S.NO	COMPONENT NAME	PART OF PIECE	DIMENSIONS
1.	Frame pipe	4	L=390mm W=280mm
2.	motor	4	60rpm
3.	Big motor	1	10rpm
4.	Disk	1	D=155mm
5.	Pipe	1	210mm
6.	Gear	2	D=50mm
7.	Wheels	4	D=65mm
8.	White motor	1	Volt=24V Current=0.45Amp
9.	Scrip	1	L=490mm
10.	Joy Stick	4	L=344mm
11.	Long Bolt	1	L=170mm
12.	Screw	4	Pitch=0.2mm

If load is applied on vehicle is 5 kg and length is390mm width of vehicle is 280mm.
Find the reaction developed by each wheel and find the torque of each wheel.

Weight =5kg
Length =390mm
Width =280mm
To find the reaction force on each wheel (r)

$$R=\sqrt{\left(\frac{l}{2}\right)^2+\left(\frac{b}{2}\right)^2}$$

$$R=\sqrt{\left(\frac{385}{2}\right)^2+\left(\frac{270}{2}\right)^2}$$

R=239.11
R=240mm
Reaction per wheel = w/4 =4/4 = 1
Weight = Mg =1*9.81
=9.81N
Torque on each wheel (T)
T = R*r
T =9.81*240
T =2.354N.m

Calculation of Motor:
Specification and calculation
N= 10rpm
Voltage = 12volt
I = 2 Amp
Power = 12*2 VA
Speed ratio

N_1=10 rpm, T_1=15
N_2=? , T_2=38

$$N_1/N_2=T_2/T_1$$

$$10/N_2=38/15$$
N_2=3.94 rpm

$$P=2\pi NT/60$$
$$24=2\pi 4T/60$$

T=57.29Nm
T= 57.29*10^3 N.mm

S.NO	NAME OF COMPONENT USED	QUANTITY	COST OF COMPONENT
1.	Wheel	4	300 Rs
2.	DC Motor 10rpm	1	200 Rs
3.	DC Motor 60rpm	4	800 Rs
4.	Small Gear	1	70 Rs
5.	White motor	1	350 Rs
6.	Big Gear	1	170 Rs
7.	Clamp	4	250 Rs
8.	Long Bolt	1	130 Rs
9.	Joy Stick	4	230 Rs
10.	Pipe	1	120 Rs
11.	Big Pipe	1	250 Rs
12.	PCB	1	110 Rs
13.	Strip	1	180 Rs
14.	Disk	1	220 Rs
15.	Adopter	1	240 Rs
		TOTAL	3620 Rs

ADVANTAGES:
*Eco friendly
*Less costly
*More Efficient
*Less Noise operation
*Car can Easily Parked

APPLICATION:
*It is used in automated guided vehicle
*Industries for transportation of raw material
*In automobiles application

CONCLUSION

This project is made with pre planning, that is provides flexibility in operation. This innovation is made the more desirable and Economical. This project 360 degrees rotating vehicle is designed with the hope that

it is very much more economical and help full to vehicles for U-turns and other purpose. Thus we have completed the project successfully.

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