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RF Controlled Pneumatic Modern Three Axis Trailer

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ABSTRACT

To overcome the problems faced in automobile vehicles (when lifting the load at the time of emergency, in inconvenient places to lift the load and also replace the manual lifting operation when lifting the load) we will introduced this modern technology. "RF Controlled Pneumatic Modern Three Axis Trailer" is nothing but one of the Lifting system in automobile at the time of emergency. Here the additional pneumatic cylinder, remote Control system is provided in the automobile. In this project, the remote control system is used to activate/deactivate the Air input and also to rotate the truck in three axis. This entire process will do by the driver through the remote control. The Valve is 'ON' at the time of emergency; the compressed air goes to the pneumatic cylinder. Then the compressed air passes through the tube, and then pushes the pneumatic cylinder, so that the Lifting is applied. The speed of the pneumatic cylinder is varied by using flow control valve.

Keywords: Transmitter, Receiver, Spur Gear, Power Supply System, Air Compressor and DC motor, trailer, RF (resistive frequency)

I. INTRODUCTION

1.1. Introduction:

The project aim is designing a "RF CONTROLLED PNEUMATIC MODERN THREE AXIS TRAILER" Which helps in lifting the weights easily through a remote made using RF technology using spur gear arrangement. This system finds very useful in automobile industry as this eliminates manual lifting mechanisms used now a days.

RF Communication ranges in between 30 KHz to 300 GHz. RF communication works by creating electromagnetic waves at a source and being able to pick up those electromagnetic waves at a particular destination. These electromagnetic waves travel through the air at near the speed of light. The wavelength of an electromagnetic signal is inversely proportional to the frequency; the higher the frequency, the shorter the wavelength.

This Project consists of Microcontroller Unit, DC motor RF transmitter and RF receiver. RF remote board has two buttons for moving geared DC motors up and down. Each button will be transmitting unique data through RF transmitter when pressed. The Data will be received by RF receiver and this is fed to Microcontroller which takes the decision to operate the motor connected to spur gear arrangement with pneumatic set up accordingly. To perform this intelligent task, microcontroller is loaded with a program written in embedded 'C' language.

The automobile vehicle is being atomized for the following reasons.

To reduce the work load

To reduce the fatigue of workers

To high responsibility Less Maintenance cost

The objectives of the project include:

1. Operating geared DC motor using a Remote control.
1. Wireless transmission using RF.

1.2 Advantages, Disadvantages and, Applications

Advantages:

1. Construction of low cost and simpler weight lifting mechanism.
2. Design of mechanical based RF based pneumatic trailer
3. Usage of spur gear arrangement
4. Repairing is easy.
5. It requires simple maintenance cares

Disadvantages:

1. Low weight lifting
2. RF wireless supports for limited distance
3. Separate air tank or compressor is required

Applications:

1. In industries which can be practically implemented in real time.
2. It can be used in mechanic sheds, weight lifting equipments at courier parcels
3. It is very much useful in constructional areas.

1.3 PROJECT OVERVIEW:

The project RF controlled pneumatic modern 3 axis trailer using pin microcontroller, control switches, RF transmitter and receiver, DC motor and regulated power supply is an exclusive project.

The thesis explains the implementation of "RF controlled pneumatic modern axis trailer". The organization of the thesis is explained here with:

- Presents introduction to the overall and the overview of the project. In the project overview a brief introduction "RF controlled pneumatic modern axis trailer" and its applications are discussed.

II. LITERATURE REVIEW

Trailer has lots of applications in today's world. In industrial and domestic considerations, trailer can haul a variety of products including gravel, potatoes, grain, sand, compost, heavy rocks, etc. by considering this topic study and research on this tractor and lorry mechanism in order to make the truck and make the more efficiency of this problem. Now days we have the trailer can dump the load only in one side by using hydraulic jack mechanism, it is more expansive and it required more energy. By using this research it is easy to drive and comfortable to operate and also reduce the time and fuel consumption rate and also implement the wireless controlling system to operate the truck this system is operated by the power restive frequency signal and it easy to operate it is easy to operate.

Initial stage of trailer utilized to drag and abandon material was than the existing cart. It had been consisted of the center gravity two wheeled cart hinged axle. This is just behind the axle when loaded condition. After that 1900, the four wheeler vehicles developed through the loading and unloading of the material due to transporting of goods without any effects. It will take more time consumption and it used in single direction application. When the solenoid valve is locked that time the pneumatic cylinder will not activated but when the solenoid valve is releases then the pneumatic cylinder will activate and this entire operation will done by the driver through the RF controller.. In 1904 the first Mann gravity dump was designed and build in England. The hydraulic dump body was developed by Alley & Mclellan of Glasgow in 1907.It was driven by means of steam power. In the further researcher focus to develop the dump truck unloading condition in the way of driving force, control, special accessories, etc.

Euclid was a pioneer in the development of dump trucks. George Armington Jr., son of founder George Armington, was a hydraulics designer and made two significant contributions to the world of dump trucks. These included the modern heavy duty off-highway truck and the wheel tractor bottom dump wagon

III. METHODOLOGY

"RF CONTROLLED PNEUMATIC MODERN THREE AXIS TRAILER" is nothing but one of the Lifting system in automobile at the time of emergency. Here the additional pneumatic cylinder, remote Control system is provided in the automobile. In this project, the remote control system is used to activate/deactivate the Air input and also to rotate the truck in three axis. This entire process will do by the driver through the remote control.

Manufacturing of body:

The entire body is manufactured by the iron pipes. Steps of manufacturing of frame

- Take the iron pipe which have in the square shape
- Cut the pipe with required dimensions
- Joint the cuted piece by using welding in required shape show in figure 3.1

Figure 3.1 three axis modern trailer

- After that grind war the welding is done by using grinder due to smoothness purpose
- Then after wheels will be fix
- After fixing the wheels mould the truck body

Manufacturing of frame:

- Frame is made by steel sheet
- take the flat steel sheet with the required length and breadth
- cut the sheet with required dimensions
- After cutting the sheet joint the cutted sheets as show in fig 3.1
- after that grind the frame by using grinder
- this grinding frame will fix on the body which is on the spur gear

Fixing of gear, DC motor, sprocket wheel, pneumatic cylinder and chain Gear:

- take the gear with required diameter
- the gear is fix on the bearing for rotation of gear that bearing is weld on the body
- this gear is fixed between the truck frame and bearing

DC motor

DC motor is fixed back of the truck by the nut and bolt

Sprocket wheel

This is fixed on the DE motor shaft

It used for rotation spur gear

Pneumatic cylinder

Pneumatic cylinder is used to lift the load

It is connected between the center of the truck and body which is above the gear

Implementation of transmitter and receiver

Transmitter

Which transmit the signal to the receiver it is fixed near the driver seat

It contains resister condenser controlling buttons and LED light and power supply

Receiver

It receives the signal from the transmitter and operates it

It is connected to DC motor and solenoid valve

Purpose of solenoid valve is to ON/OFF the air flow valve

It is work with electricity

Air compressor

It is used to transmit the comprised air to pneumatic cylinder through pipe

Components rating:

Control buttons…….2PIN pushbutton

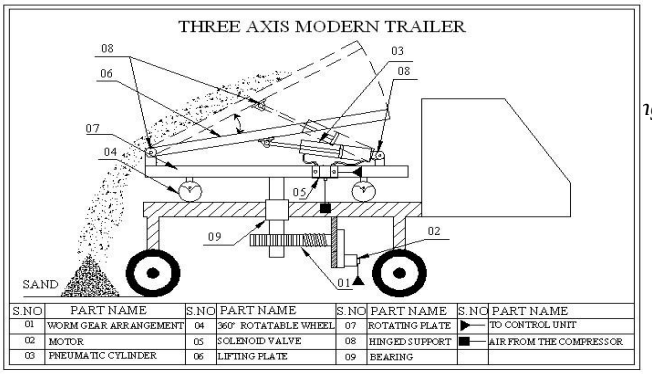
Battery……..12v/4amp

Encoder……..HT12E

Decoder……..HT12D

Encoder……..HT12E

Pneumatic piston ……30x150 dual stroke piston



S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME
01	WORM GEAR ARRANGEMENT	04	360° ROTATABLE WHEEL	07	ROTATING PLATE	▶	TO CONTROL UNIT
02	MOTOR	05	SOLENOID VALVE	08	HINGED SUPPORT	■	AIR FROM THE COMPRESSOR
03	PNEUMATIC CYLINDER	06	LIFTING PLATE	09	BEARING		

Inflator……12v/1amp

RF TRANSMITTER……..433MHZ

RF RECEIVER……433MHZ

DC motor……12v/2amp

IV. WORKING PRINCIPLE

"RF CONTROLLED PNEUMATIC MODERN THREE AXIS TRAILER" is nothing but one of the Lifting system in automobile at the time of emergency. Here the additional pneumatic cylinder, remote Control system is provided in the automobile. In this project, the remote control system is used to activate/deactivate the Air input and also to rotate the truck in three axis. This entire process will do by the driver through the remote control.

The compressed air is used to activate the pneumatic cylinder, when the valve is activated the direction of the air flow is controlled. In a movable tray the three axis pneumatic modern trailer is placed. The setup consists of a pneumatic cylinder, solenoid valve, 360 degree rotatable wheel, and a tray for lifting purpose. The movable tray consists of dc motor for rotating the trailer. A worm gear arrangement is used with motor for rotating purpose. The pneumatic cylinder is attached with the lifting plate. When the cylinder is actuated the tray is lifted to a certain height. This can be done by the compressed air as said above. The 360 degree rotatable wheel is used to turn to the required direction. The motor is used to turn the whole trailer. The motor can be stopped after certain rotation with the help of the keypad provided. The above operations are controlled by the microcontroller

Figure 4.1Drawing for three axis modern trailer

Block diagrams of transmitter and receiver show in figure 4.2 and figure 4.3

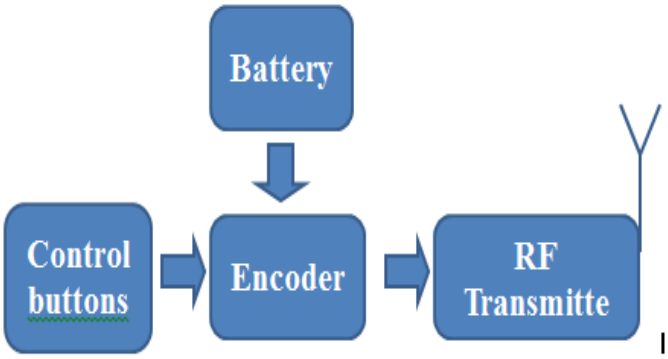


Figure 4.2 Block diagram of transmitter

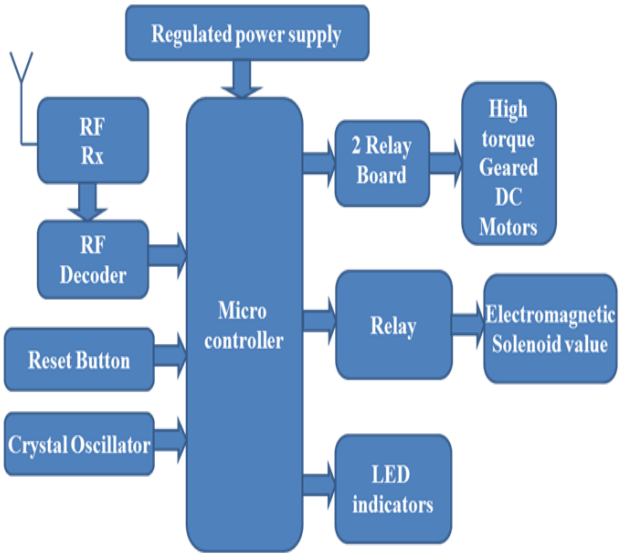


Figure 4.3 block diagram of receiver

V. RESULTS, CONCLUSION AND FUTURE PROSPECTS

Result:

The project "RF Controlled Pneumatic Modern Axis Trailer" was designed such that mechanical based screw jack system for lifting loads. The system makes use of high torque geared dc motor whose shaft is connected to the screw jack which controls using RF wireless technology. An intelligent driver is constructed which helps in moving the screw jack up and down.

Conclusion:

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

Future Scope:

Our project "RF Controlled Pneumatic Modern Axis Trailer" is in designing a mechanical based pneumatic system for lifting loads. The system makes use of high torque geared dc motor whose shaft is connected to the screw jack. An intelligent driver is constructed which helps in moving the screw jack up and down.
To perform this intelligent task, microcontroller is loaded with a program written in embedded 'C' language.

The project can be extended by using more weight geared dc motor for heavy weights.

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