

Fabrication of Staircase Climbing Vehicle

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Abstract:-- The aim of this project is to develop a stair climbing vehicle by using some geared wheels of wheels. Nowadays some kinds of vehicles are available to carry the load but none of them are not able to climb the stairs and all, since the climbing is not possible they need to find someone for help, for this job stair climbing vehicle can be used. The stair climbing vehicle is a machine which can move by using two DC electric motor and which uses a combination of spur gear by using timing belts, mainly four configurations are there and these are connected to the body of the vehicle as like the ordinary vehicle, the right turn and left turn can be achieved by controlling the left and right motor, reverse can be achieved by the altering of electric supply to the motor. When the front end of the geared wheel is hit by stairs it will automatically get locked and get climbed to the next stair by the help of Timing Belts.

Keywords: Spur Gear, Dc Motor, 12v Battery, Timing Belts and Circuits.

I. INTRODUCTION

There are certainly different kinds of technologies have been used in the stair climbing vehicle, but some of them have its own limitations over others. So in order to overcome these limitations we have introduced new technologies based on timing belt wraps so that it can climb the stairs easily. The problem which is happening on most of the vehicle is due to ineffective capacity to climb stairs. This may be due to different problems. For ordinary vehicles it doesn't have the capacity to climb stairs and even it requires some external help. The other main problem which is been identified is that some of these vehicles are failed to detect obstacles in front of them. Even some may not work on rough terrains. But in this vehicle we rectified these problems by replacing the wheel configuration of spur gear arranged in planetary manner. The above problem can be solved in these types of vehicle. In this by using spur gear the movement of wheel will be smooth thus making sure that it does not fall down on to the ground. It can also climb stairs easily without having any external help.



Fig 1: FABRICATION OF STAIRCASE CLIMBING VEHICLE

2. METHODOLOGY OF THE PROJECT

The methods which are followed on this staircase climbing vehicle are as follows:

- A spur gear has been introduced with timing belt wraps.
- Independent motors are used to power the rear wheels.
- Microprocessor board called the Arduino Nano is used to control and propagate to the vehicle.

3. SPECIFICATIONS

SPUR GEAR:



NO OF TEETH: 25

INNER DIA : 16 mm

OUTER DIA : 70 mm

DC GEARED MOTOR:

SPEED 300 RPM
 OPERATIVE VOLTAGE 12 VOLT



BATTERY:

LEAD ACID RECHARGABLE
 OUTPUT 12 VOLT
 CURRENT 7.5 AH



TIMING BELTS:



LENGTH OF BELT: 1066 mm
 WIDTH OF BELT: 25 mm

4. WORKING MECHANISUM

A stair climbing vehicle is a type of vehicle fitted with geared wheels so that it can be operated up or down a stair way. Stair aid can be battery-powered, and are commonly found in wheel, track. Each wheel is replaced by spur gear. Staircase

climbing vehicle is a vehicle which can move by on by using electric motor and the wheels are replaced by spur gears. Mainly four spur gears are used and it is connected by using timing belts. When the DC motor start rotating it will transmit the power to gear assembled in motor and these power will be differentiated to secondary gears.

5. SCOPE AND ADVANTAGES:

- Beneficial in transport of heavy components from a lower level to higher level, in places/ buildings where accessibility of lifts or hoists is not possible.
- Aids in multiple material movements in large quantities, again, from a lower level to higher level in a production based organization for smoother operation processes.
- It can move in all direction.

CONCLUSION

The experimental set up for the stair climbing vehicle has been done. In this paper we have designed the vehicle, capable of climbing the stairs without any external help. The system has following functions

- Drive by wire operation
- Easy travel in rough terrains
- Easy assembling

The experimental setup shows that it is highly applicable and secure to operate in different conditions.

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