360 DEGREE TROLLEY WITH CONVERTIBLE WHEELS

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Abstract : This project is about designing a 360 degree trolley with convertible wheels .The load is made to carry usually by manually ordinary wheels which can be replaced by convertible wheels which is also used in load carrying and transmission. In this research we focused on finding an efficient control over the direction of convertible wheels and load transmission while climbing the steps. A chain link power transmission system is supposed to rotate the convertible wheels using handling. Therefore, such a system can be replaced by convertible wheels used for transmission purpose. This transmission system is low cost compare with other transmission system.

I. INTRODUCTION

The research is about 360 degree rotation with convertible wheels. Here the convertible wheels are used in the purpose of climbing the steps where are to be attached at which is said to be origin. The wheels are placed at an angle of 120 degree each which favors the rotation used in climbing .The wheels are set at four points of the chassis and here these wheels are connected by 360 degree wheels drive favors the rotation of overall 360 degree rotation in the ground .The 360 degree rotation direction wheels are connected to the chain sprocket links .the sprocket can be driven by connecting shaft to it upwards and this is used to move the wheels.

There are many types of wheelchairs available in the market like manual or powered wheelchair and the choice of wheelchair depends upon the physical and mental ability of the user. Wheelchair has limitations against architectural barriers on its way. Although as per PWD 1995 act it is mandatory to provide an accessible environment in every public building but numerous buildings in India are designed without considering accessibility for physically challenged and wheel chair users. Many urban cities of India have addressed the problem by providing alternatives for the architectural barriers like providing ramps at the entrance thresholds, lowering curbs, wheeler chair ramps lift etc., but still a wheelchair user must negotiate few architectural barriers. In this study we have attempted to design a stair climbing Wheelchair concept which can address the problem faced by wheelchair users. The people with physical disability not only have less living space, but also the quality of life is seriously affected and it also brings big burden to their family. Wheelchair as a means of transport tool plays an important role in the life of those people who are old and disabled. With the society paying more attention to the benefits of elderly and disabled people, barrier free facilities as well as the elevator has been widely popularized, common wheelchairs can easily access many places, but when the user face stairs which often poses as obstacles, people can only step back, even though with the assistance from others, it is still very difficult to overcome these obstacles, which is inconvenient for those people who use wheelchairs.

2.Convertible wheel

Fig -1. Convertible wheel

A convertible wheel capability as an ordinary wheel on the flat ground, but has the potential to climb robotically whilst an impediment to rolling is encountered. This wheel configuration contains three tires, every established to a separate shaft. These shafts are positioned at the vertices of an equilateral triangle. While geared on this quasi-planetary style, these triangular sets of wheels can negotiate many kinds of terrain. They can also permit a vehicle to climb over small obstructions inclusive of rocks, holes, and stairs.The wheel assembly may be gear-driven, with two wheels in rolling contact with the ground. The third wheel idles at the top until the lower front wheel hits an obstruction. The obstruction prevents the lower front wheel from moving forward but does not affect the motion of the driving axle. This causes the top wheel to roll forward into position as the new front wheel

3.COMPONENTS

The functioning of entire device depends upon the four important parts. They are:

1) L-ANGLE FRAME

The steel angle also named angle iron or steel angle bar is basically manufactured by hot rolled carbon steel are high strength low alloy steel. It has L crossed shaped section equal or unequal. They are formed by bending a single angle in a piece of steel. Angle steel is L shaped. The most common type of steel angles are at a 90 degree angle. The legs of the L can be equal or unequal in the length.

2) WHEELS

The wheels consist of solid rubber tire on metal or plastic core and are offered in mechanical bonding between rubber and core to ensure long life. Further, these are offered in two types of Rubber Tire (RT) and Rubber Bonded (RB). The wheels consist of Rubber Bonded on a Cast iron core and are offered in chemical bonding between Rubber and Cast iron. The load carrying capacity and life of the wheel is much more than Rubber Tire wheel. These are available in two qualities for hand and auto towing purpose.

3) Sprocket

Sprockets are rotating parts with teeth that are used in a conjunction with a definition of concept and explain them in relationship to basic sprocket and chain design.

4) Mild Steel Rod

Mild steel is a malleable and highly versatile metal suited to a range of commercial, domestic and industrial application. Steel round bar is suitable for a huge range of uses, particularly to formability.

5) Chain

The powers to the drive wheel of the bicycle thus propelling it. Most bicycle chains are made from plain carbon or alloy steel, but some of are nickel plated to prevent rust, are simply for asthetics.

6) Sheet Metal

Sheet metal is metal formed by an industrial process into thin, flat pieces. Sheet metal is one of the fundamental forms used in metalworking and it can be cut and bent into a variety of shapes. Countless everyday objects are fabricated from sheet metal**.**

7) Bore Rod

Hollow rods are produced according to European standards. It is enable to less tool wear, less material consumption and metal loss by decreasing drilling and processing cost to the lowest

4.WORKING

As the trolley model designed in solid works and analysis procedure completed in the fabrication is made using accurate measurements .

The trolley can be used for carrying heavy weights mechanical components to one place to another horizontally and also multi stair steps.

Step by step procedure is described in following diagrammatical representation which consists of fabrication and analysis of Stair, wheel, trolley.

The fabrication and assembly play a major role in this construction procedure given below. In this vehicle sprocket of front wheel are connected to second chain drive.when steering is to rotate clockwise and anticlockwise direction.

5.ADVANTAGES

- Stair climbing ability.
- Easy to control.
- It works with more efficiency.
- Self-controlled operation of wheelchair without helper.
- It can move in all direction.
- Simple autonomous operation on stairs and steep slopes possible.
- Operation as a standard wheel chair .
- Some extent possible.

6.DISADVANTAGES

- It works with limited weight and chair climbs the stair backwards.
- Its is manually controlled.

7 .NEED AND SCOPE OF WORK

- To reduce man power.
- To reduce labor cost.
- Easy to carrying loads.
- NO NEED ANY ENERGY SOURCE.

8. Pro-E model

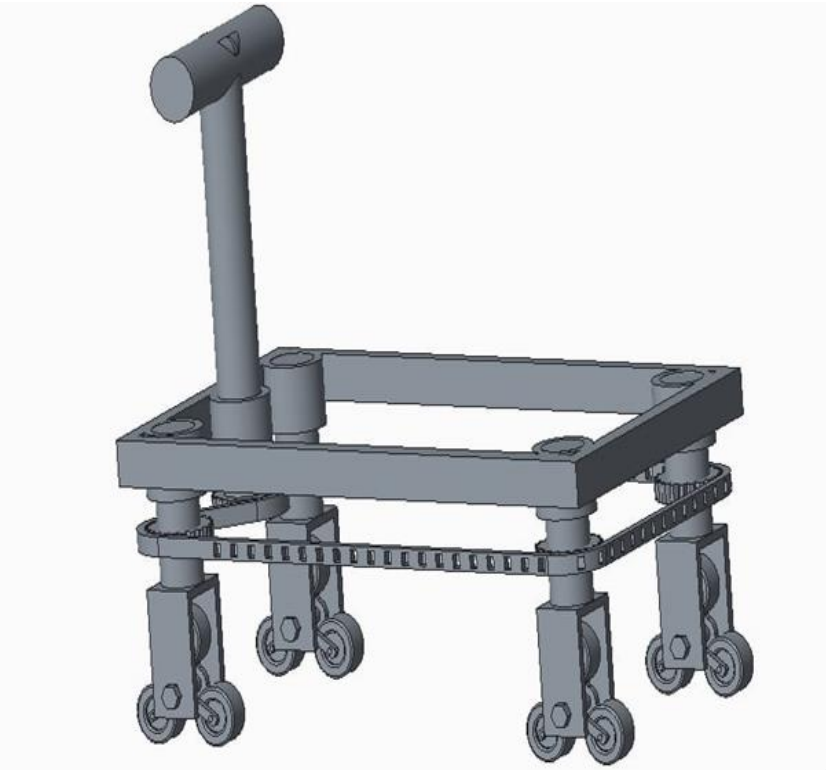

Fig - 2

9. **Fabrication of 360 degree convertible wheels**

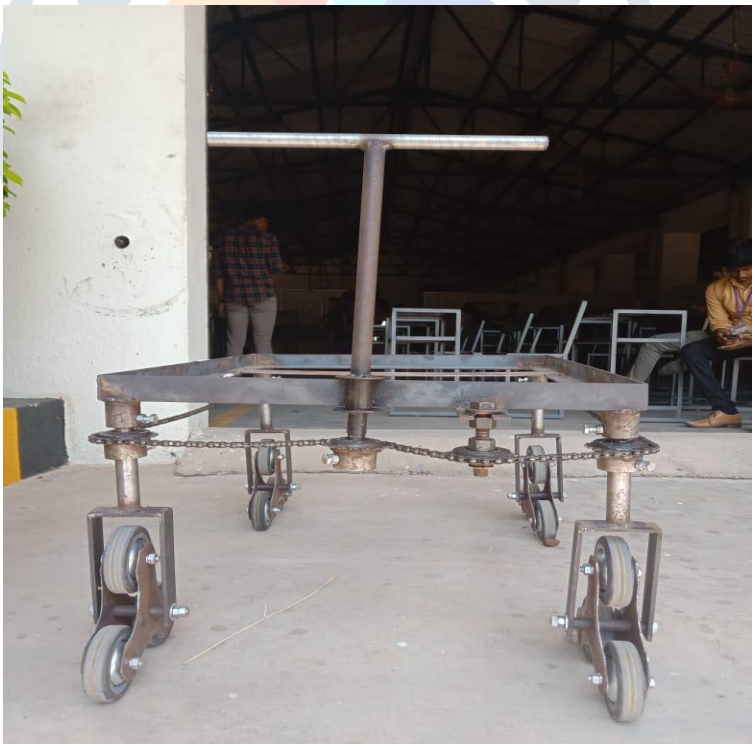

Fig - 3

10. CONCLUSION

A prototype for the proposed approach was developed by introducing steering and manually wheel rotate 360 degree and convertible wheel to climbing on the steps to forward and backward. This prototype was found to be able to be maneuvered very easily in tight spaces, and after manufacture of 360 degree wheel rotation vehicle consumed very less space to turn from one direction to another direction and it consumes less time to turn and this vehicle used in various areas such as small industries, railway platforms.

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