RESEARCH ARTICLE OPEN ACCESS

Design And Fabrication of Rocker BOGGIE Mechanism A Review

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ABSTRACT-
Rocker bogie is essential for conducting in-situ scientific analysis of objectives spanning from several meters to tens of miles. Current walking designs are complex, using multiple wheels or legs. They are open to mechanical failure caused by a difficult location on Mars. A four-wheel-drive rover that can traverse rough terrain uses a high level of navigation system. A key feature of the rocker bogie design machine is its simplicity of the driving train, which is accomplished using only two navigation engines. Both engines are located inside the body where the temperature variation is kept low, which increases reliability and efficiency. Four wheels are used because there are a few obstacles in the natural environment that require both front rover wheels to climb at the same time. A series of travel tests on agricultural land, rough roads, steep slopes, stairs and obstacles conclude that a rocker bogie can reach a certain distance across a field..
Keywords: Rocker bogie, Wheel type robot, Rover, Wireless surveillance, DC Motor etc.

Date of Submission: 25-04-2022 Date of Acceptance: 07-05-2022

I. INTRODUCTION

Over the past decade, the design of the rocker-bogie suspension has become a proven travel application known for its high automotive stability and ability to climb obstacles. After much technology and the introduction of the research rover, the program successfully entered as part of Mars Pathfinder's Sojourner rover. When the Mars Exploration Rover (MER) Project was first proposed, the use of rocker-bogie suspension was an obvious choice because of its large heritage. The challenge posed by MER was to design a rocker-bogie suspension that allows for limited access and is placed in a place where the rover can safely use it to get out of the garbage dump and explore the Martian area.

The rocker bogie suspension system, specially designed for space exploration vehicles has a deep history focused on its development. The term "rocker" refers to the movement of large connectors on each side of the suspension system and the bogie scale as these interlocking rockers and car chassis use alternately modified alternatives.

And the movement to keep the center of gravity of the whole car, where one rocker goes up-name, the other down. The chassis plays an important role in maintaining the angle of the pitch between the two rockers by allowing both rockers to move in a straight line. As a powerful construction, one part of the rocker is fitted with a steering wheel and the other is mounted on a board that provides the required movement and level of freedom.

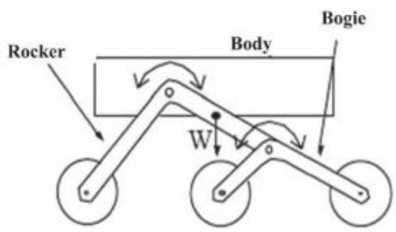

Figure 1. 2D Line diagram of Rocker-bogie suspension system and its motile joints

In a system, the word "bogie" means a compact connector with a steering wheel attached at each end. Bogies were often used for loading as songs of military tanks as lazy spreading cargo in the area. Bogies were also commonly used in semi-trailer truck trailers as at the same time trucks would have to carry a heavier load.

II. LITERATURE SURVEY

• *F. Ullrich et. al. 2010, "Design Development of Mars Rover's Rocker-Bogie Mechanism using Genetic Algorithms"*. In this paper, there are two important advantages in this regard. The first advantage is that the pressure of the wheels on the floor will be equal. This is especially important in a soft area where excessive ground pressure can cause the car to sink into the driving area.

• *Hong-an Yang et.al. 2014, "Dynamic Rocker-Bogie:* Development of High-Speed Traversal Stability". In this paper, Instruments that were placed during occupation will be used during driving and were not designed to withstand heavy loads in their configuration for the collection of science. The compulsory requirement for the design was to create a "soft" suspension to limit the acceleration experienced by the payload while driving.

• *S. Chinchkar et.al 2017, "Design of Rocker Bogie Mechanism".* Rocker bogie is essential for conducting in-situ scientific analysis of objectives spanning from several meters to tens of miles. Current walking designs are complex, using multiple wheels or legs. They are open to mechanical failure caused by a difficult location on Mars. A four-wheel-drive rover that can traverse rough terrain uses a high level of navigation system.

• *Rahul Shrivastava et. al. May 2021, "Design and Performing Rocker-Bogie Mechanism".* The rocker-bogie suspension system has the ability to deal with uneven terrain because it carries a charge load over its six wheels alike. One of the biggest mistakes of the current Rocker-Bogie roles is that they are slow. In our project, we focused on building a six-wheeled rocker bogie suspension system with the benefit of direct bogie movement to protect the entire system from getting rollovers during high-speed operation.

III. PROBLEM IDENTIFICATION

Over the past decade, the design of the rocker-bogie suspension has become a proven travel application known for its high motor stability and ability to climb obstacles. When you build a robot you would like it to be as simple as possible. In most cases you will never need a suspension system, but there have been a few instances where the suspension process is unavoidable. The word "bogie" means links with a steering wheel at each end. Bogies were often used as load wheels on the tracks of military tanks as lazy people spread the load in the area. Bogies were also commonly used in semi-trailer truck trailers. Both applications now prefer consecutive arm suspension. The rocker-bogie design has no springs or axles on each wheel, allowing the rover to climb over obstacles, such as rocks, which are twice the size of the wheel while keeping all six wheels down. As with any suspension system, tilt stability is determined by the height of the pull center.

IV. OBJECTIVE

Objective of this project is to design a small robust and highly manoeuvarable boggie robot .it will be designed for working on different plat form like rough terrains, smooth surface, overcoming obstacles in its path and climbing over obstacles of certain height , choosing different predetermined gaits and to have good stability,speed as well as payload capacity.

V. DESCRIPTION OF THE PROPOSED WORK

a. Design of system

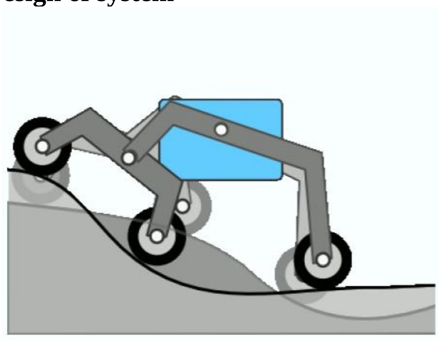

Figure 2 Rocker Boogie System

b. Working Principle

An important factor in the construction of a rocker bogie machine is to determine the size of the rocker contact with the bogie and the angles between you. The length and angles of this machine can be adjusted according to individual needs. At work the aim is to make a rocker bogie machine that can overcome obstacles 150 mm long (such as stones, wooden blocks) and be able to climb stairs 150 mm long. Also intended for mounting anywhere at an angle of 45˚. To achieve the above objectives we have designed a rocker-bogie model by taking a staircase length of 150 mm and a height of 370 mm. Using Pythagoras' theorems, find the model size. It has both 90˚ connecting angles.

Walking over the obstacle, the front wheels are forced against the obstacle by the rear wheels. The front wheel rotates and raises the front of the car to the top despite the obstacle.

The center wheel is the one that is pressed against the rear wheel and is pulled forward, until it is raised. Finally, the rear wheel is pulled over the barrier by two front wheels. During the cycle of each obstacle wheel, the motor movement decreases or stops completely. These rovers move slowly and climb over obstacles by making the wheels lift each hanging part over one obstacle at a time.

c. Components

1. Shaft – 1
2. Link - 4
3. Bearing – 2
4. Motor – 6
5. Wheel – 6
6. Wireless Camera – 1
7. Battery– 1
8. Control Board – 1
9. Power Adapter - 1

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