

## STEP STAIR CLIMBING ROBOT CAR

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### ABSTRACT

*In this paper, we present our project step stair climbing robot car. Ultimately it has resulted in the invention of the robot. In today's life, technology concern with robots plays an important role in many fields. Our project concerns six wheels or legs. The design of our project contains fixed and flexible links of wheels. Our project has two parts: one is the Rocker and the other is the Bogie. The Rocker has fixed legs and the bogie has flexible legs. A four-wheel bogie is capable of travelling on rough surfaces or step surfaces. It is a wireless-controlled robot through a wireless remote. The first step of this project is the four-wheel bogie part, which will have the capability of climbing stairs of a height of two times the wheel diameter. The wheels are driven by DC motors for climbing stairs. This project will be upgradeable with a variety of applications. The long-term goal of the research is to develop an outdoor platform suitable for security and separate missions. The robot can complete complex tasks in several areas using wireless control.*

**Keywords-**Stair climbing, Wireless remote, Leg coordination, Low cost design.

### 1.INTRODUCTION

Adjustable stair climbing robots are one of the most attractive performances of robots in legged and wheeled. Developments have been made on various kinds of stair climbers, considering how to make their climbing ability higher and their mechanical complexity reasonable and practical. The research includes realizing a large step negotiating. Reducing body weight and energy consumption is also an important matter of development. We introduce some solutions to realize stair climbing machines that we developed. Each of them has good performance as in a category of their kind, e.g. various numbers of wheeled shapes. Then, we discuss a development of adjustable high-grip mover, which we think is one of the best solutions as the stair climber. A mechanism is a combination of rigid or restraining bodies so shaped and connected that they move upon each other with definite relative motion. A machine is a collection of mechanisms which transmits force from the source of power to the load to be overcome, and thus perform useful mechanical work. Robotics is the area of automation which integrates the technology in varied fields like mechanisms, sensors & electronic control systems, artificial intelligence and embedded systems.

## II.LITERATUREREVIEWREPORT

There have been a lot of developments and innovations in stair climbing robots with different locomotive mechanisms. They can either move using legs or using wheels. Robots usually have to use mechanical concepts to climb stairs.

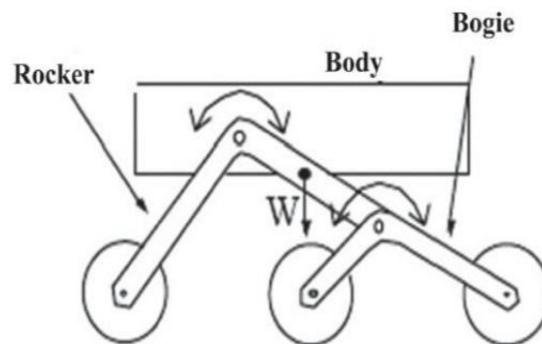
### *Principle*

The rocker-bogie design consisting of no springs and DC motor in each wheel which allows the chassis to climb over any rough surfaces, such as rocks, ditches, sand, steps, etc. that are up to double the wheel's diameter in size while keeping all wheels on the ground maximum time. As compared to any suspension system, the tilt stability is limited by the height of the centre of gravity and the proposed system has the same.

### *Methodology*

The rocker bogie system reduces the motion by half compared to other suspension systems because each of the bogie's six wheels has an independent mechanism for motion and in which the two front and two rear wheels have individual steering systems which allow the vehicle to turn in place as 0 degree turning ratio. Every wheel also has thick coated rubber which provides grip for climbing in soft sand and scrambling over rocks with ease. The rotation of the front wheel then lifts the front of the vehicle up and over the interceptor.

### *Project Block Diagram*

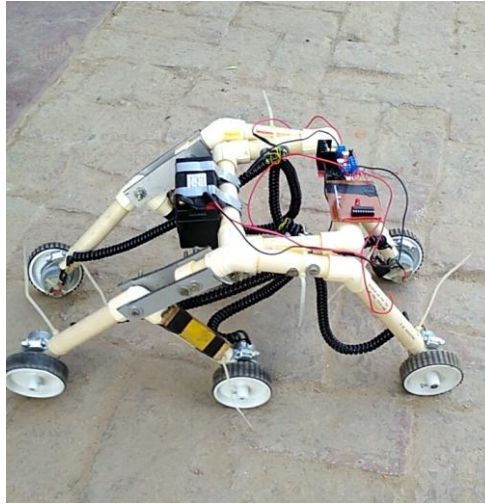


**Figure1:** Block Diagram of Step Stair Climbing Robot Car

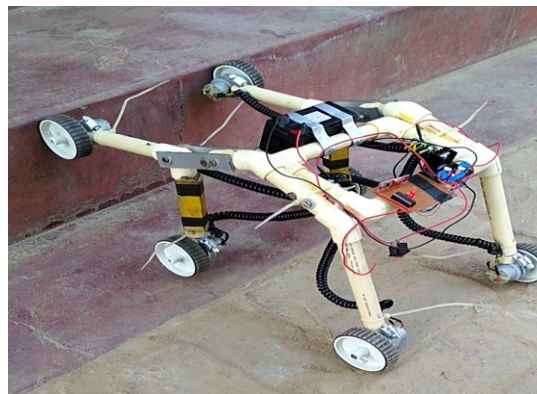
### *Observation*

A The main problem associated with current suspension systems installed in heavy loading vehicles rovers is their slow speed of motion. For better observation and analysis, a 3D model of Rocker bogie system results are shown below.

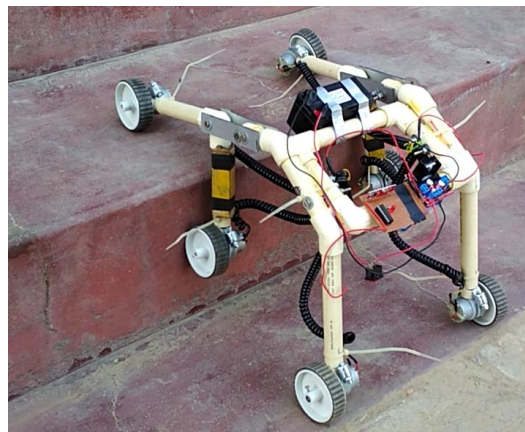
*Project Diagram*



**Figure-1: Robot Model**



**Figure-2: Moveable Robot Car**



**Figure-3: Climbing on Stair**

### **III.APPLICATIONS**

- a. Military
- b. Space finder
- c. Medical
- d. Wheel Chair
- e. Bomb Diffusion Squad
- f. It can be develop into Suspension system for the automobile vehicle through proper research.

### **IV.CONCLUSIONS AND FUTURE SCOPE**

In this paper we have developed an adjustable stair climbing robot to replace human effort to carry out mundane tasks in places like offices, hospitals, industrial and military automation, security systems and hazardous environments. There is a lot of scope for improvement and this mechanism can be further modified and used in various other applications such as carrying heavy loads and thus further reducing human effort. Another scenariowhere this mechanism can be employed is during disaster management. A camera can be fitted on the robot to have a wide field of view of the affected areas which can further help in search and rescue operations. This robot can further be integrated with mobile devices to process the images fed by the camera and act accordingly to the stairs.

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