

# ELECTRIC POWERED STAIR CLIMBING TROLLEY

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## ABSTRACT

*The project aims to bring forward a way to move heavy objects over stairs. The necessity of such a system is clear from the day-to-day requirements of our society. Devices like hand trolley are wont to relieve the strain of lifting while on flat ground; however, these devices usually fail when it becomes necessary to barter a brief flight of stairs. Within the light of this, the project attempts to style a stair climbing hand cart which might carry heavy objects up the steps with less effort compared to carrying them manually.*

*It also endeavors to check the commercial viability and importance of such a product. Several designs were conceived that might allow a non-industrial hand trolley to travel over stairs, or uneven terrain while putting minimal strain on the user. One strategy, a three-wheel rotating system, was selected for development and a number of other solid models were created and a prototype was constructed. The finished prototype was tested with a payload of approximately 100 kg, and it had been determined that the hand trolley design could be a viable option for a stair-climbing consumer product.*

**Keyword :-** Stairs, trolley, triwheel, elevate, effort

## I. Introduction

An ordinary hand trolley is which includes tri wheels placed at the bottom of trolley. the two handles are furnished to help the frame and applied the human attempt. handles are used to push or pull the trolley. the scale, form, and function of handle are vary according to requirement. the wheels are Mounting on shaft supported through bearing. the material used to make trolley is unique consistent with the operating load. to carry heavy load the trolley is made from stainless steel and to carry mild load trolley made from slight metallic. the load is mounting on pinnacle of the trolley. in a few cases rectangular field is furnished to hold the burden. the fabric for rectangular container is vary according to the operating load. the varieties of trolley used are wheeled trolley, folding trolley, kitchen trolley, and Motorized trolley. stair mountain climbing trolley is designed to lift the high weight with much less human attempt. conventional hand trolley is designed to motion on flat surface but it cannot move on irregular floor or on stair (step of ladder). in stair mountain climbing trolley more than triwheels are furnished. these combos of wheels are works as single unit. in stair mountain climbing trolley three wheels are connected to the shaft by means of triangular plate or immediately rod. such type of trolley could be very Useful in switch books in library and also used in domestic. while person are injured at that point to lift load by using using such kind of trolley is very smooth. the main component to design the motorized stair climbing trolley is wheel-frame, wheel, shaft, gear, motor, battery and bearing.

## II. Literature review

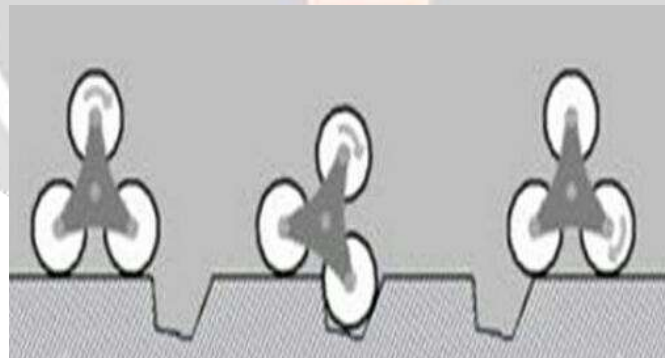
**Md. A. Hussain :-** Designed and manufactured a stair climbing vehicle using modified form of frame arrangement i.e a curved wheel frame which move on rough surface. To address several technical issues in designing this vehicle is stability and maintain high speed at vehicle wheel arrangement while climbing stairs. The frame arrangement consists of sun, planetary, idler wheel which are assembled to the shaft which reduces application of load. However, the steepness of the stairs is also the important concern of this study. The vehicle has four set of wheels arrangement to support its weight when it moves over the flat terrain. Each wheel frame consists of three sub-wheels attached with the sun wheel through three idler gears.

**P. Jey Praveen Raj :-** Designed and manufactured a stair mountaineering vehicle the usage of modified shape of body arrangement i.e a curved wheel frame which pass on rough surface. to address numerous technical Troubles in designing this automobile is balance and preserve high speed at car wheel arrangement whilst mountain climbing stairs. the frame arrangement consists of sun, planetary, loafer wheel which might be assembled to the shaft which reduces utility of load. but, the stiffness of the steps is likewise the important concern of this take a look at. the car has 3 set of wheels association to help its weight while it movements over the flat terrain. every wheel body includes three sub-wheels connected with The solar wheel via loafer sprocket.

**Roshan Alaspure :-** Designed and fabricated a stair hiking wheel mechanism which can be taken into consideration as trade for lifting items in this kind of manner that it could be climb a stepped course with its changed wheel shape the usage of guide metallic arc welding or stick welding. an electric powered contemporary is used to strike an arc between the bottom material and consumable electrode rod or stick. the electrode rod is product of a fabric this is like minded with the bottomMaterial being welded and is covered with a flux that gives off vapors that serve as a protecting fuel and provide a layer of slag, both of which shield the weld vicinity from atmospheric contamination. trolley up short flights of stairs just to attain the front door of a building. the whole purpose of the use of a traditional hand trolley is to keep away from having to lift and deliver heavy objects around.

### Tri-Star Wheel

The triwheel become designed in 1967 via robert and john forsyth of the Lockheed Aircraft organisation. they have been first advanced as a module of the lockheed triwheel, a commercially unsuccessful amphibious navy car. a tri-star wheel features as an everyday wheel on flat ground, but has the ability to climb routinely whilst an impediment to rolling is encountered. this wheel design includes three tires, each hooked up to a separate shaft. these shafts are located on the vertices of an equilateral triangle. the one shafts are geared to a fourth, vital shaft(to which a motor can be connected). while geared in this quasi-planetary fashion, those triangular units of wheels can negotiate many forms of terrain, together with sand and mud; they also can allow a vehicle to climb over small obstructions such as rocks, holes, and stairs. the wheel meeting may be sprocket-pushed, with wheels in rolling contact with the floor. the third wheel idlers at the top until the decrease front wheel hits an obstruction. the obstruction prevents the decrease the front wheel From transferring forward but does no longer have an effect on the motion of the driving axle. this reasons the pinnacle wheel to roll ahead and backward into function as the brand new the front wheel. this wheel normally lands on pinnacle of the obstruction and permits the relaxation of the meeting to vault over the obstruction. tri-big name wheel in movement is proven in figure.



### Gear Motor

Gear motor is a special kind of electric powered motor that moves in precisely defined increments of rotor role (steps). the dimensions of the increment Is measured in degrees and can range relying at the application. because of unique manage, Gear vehicles are generally utilized in scientific, satellites, robotic and manipulate packages. there are several features common to all Gear cars that make them perfectly suited for those sorts of packages. they may be as underneath high accuracy: perform underneath open loop reliability: Gear cars are brushless. load impartial: Gear motors rotate at a hard and fast pace underneath special load furnished the rated Torque is maintained. protecting torque: for every and every step, the motor holds its function with out brakes. Gear motor calls for sequencers and driving force to function. sequencer generates collection for switching which determines the path of rotation and mode of operation. driver is required to change the flux route inside the section windings.



### Battery

The batteries wherein a reversible response is chargeable for the era of strength such that they can be reverted to the unique Reactant state fall underneath the category of secondary batteries. recharging is effected by way of passing electric modern through the battery. the oldest form of rechargeable battery is the lead-acid battery. lead acid battery marketplace is dominating normally due to the unavailability of any capable competitive answer in the market and they provide lowest cost in line with watt-hour despite in their low unique energy. the preference to make these batteries maintenance unfastened, the flooded battery kind evolved Into editions: sealed lead acid or gel cells and valve regulated lead acid (vrla) batteries.



### Wheel Frame

A particularly designed wheel frame is required to preserve the cars together on each facet of the shaft. inside the current design, the strength transmission to the unmarried or double wheel is vain to climb the stairs because of peak issue of stairs. the design of the directly wheel frame became extra complex and was had to be changed with its curved- round form to give proper force, Which creates more frictional force. for these purpose, tri wheel set on every facet of car connected with frame changed into brought to offer smooth strength transmission to climb stairs without an awful lot trouble. frame arrangement is appropriate to transmit exact speed ratio additionally. it provided higher efficiency and compact format with reliable carrier.



### Roller Chain

Bush roller chain or Curler chain is the form of chain pressure most typically used for transmission of mechanical power on many types of Home, business and agricultural machinery, such as conveyors, cord-drawing and tube drawing machines, printing presses, vehicles, motor cycles and bicycles. it consists of a chain of quick cylindrical rollers held together by way of facet links. it's miles pushed with the aid of a toothed wheel known as a sprocket. it is a simple, reliable, and green approach of strength transmission.



### Sprocket

A sprocket or sprocket-wheel is a profiled wheel with teeth, or cogs, that mesh with a chain, music or different perforated or Indented material. the name 'sprocket' applies typically to any wheel upon which radial projections engage a chain passing over it. it's far outstanding from a tools in that sprockets are by no means meshed collectively directly, and differs from a pulley in that sprockets have teeth and pulleys are smooth. sprockets are of diverse designs, a maximum of efficiency being claimed for every with the aid of its originator. sprockets normally do no longer have a flange. a few sprockets used with belts have flanges to maintain the Timing belt centered.

## III. Conclusion

The layout of the trolley is compact and consequently is capable of circulate approximately in nearly all of the stairs that we discover at establishments, workplaces, industries and additionally at a few homes. the layout is made very safe and there's no risk of failure of the body and wheels beneath ordinary circumstance. consistent with the assessments conducted, the stair climbing trolley has a potential of sporting a load of 50kgs on flat floor. it has the ability to ascend a flight of stairs of 45-diplomaElevation carrying a weight of 50kgs.the primary benefit of the mission is stair mountaineering mechanism for load service with decreasing effort. doing higher work with lesser attempt has been the principle objectives of people in any area. this assignment as platform we gift motorized stair case hiking trolley with decreasing attempt. the destiny enhancement of our assignment is we ought to rectify the problems that we've encountered in the course of descending of the trolley in stairs. we had a easy journey Even as ascending however even as coming down from the stairs, we observed a few vibration problem and to triumph over this we've planned to install springs and braking machine, in order that trolley may be in an amazing manipulate whilst descending also.

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