

Stair Case Trolley for Goods Transportation

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Abstract

Today, simple mechanical devices such as one-wheel and two-wheel wheelbarrows are used in a variety of industries, not just for domestic purposes. However, their use is limited to the transportation of goods from one location across the floor to another. None of the formalized structures available on the market meet the need for support when climbing stairs with luggage. To overcome this difficulty, stair wheels (a combination of three wheels) are used instead, reducing the effort required to lift. This paper designs and manufactures a three-wheeled stair climbing trolley for transporting significant loads across rough surfaces and up stairs using an improved wheel assembly with relatively little manpower and manufacturing costs. Focuses on. Describes design concerns such as the steep slopes of stairs and the stability and speed of trolleys when climbing stairs. Hybrid vehicles such as B. Tricycles can be used to transport multiple items in different locations where mechanical elevators cannot be installed.

1.INTRODUCTION

In day these days lifestyles we may additionally should bring such a lot of goods and gadgets of diverse portions through stairs particularly in workplaces, faculties, colleges, motels, industries, apartments and many others. in which the lifts might not be available, can be crowded with people or may be under restore. it's miles tremendously tiresome to carry numerous gadgets thru stairs manually

for better floors for so regularly.

The numerous packages can be sporting bundles of answer sheets in a college or a college, sporting furniture in different homes, one of a kind equipment in colleges, in hospitals and so on., sporting digital gadgets in homes and offices. So, there have to be a manner to hold the items thru the stairs in a more cozy and tireless manner with out forcing the user to apply extra force. right here comes the software of a stair climber.

1.1 RESEARCH BACKGROUND

In everyday life, there could be many instances where heavy loads will should be carried among two places, inclusive of journey suitcase, books, and so on. In maximum of those conditions, these gadgets can be effortlessly carried in hand. but, over the current years, the upward thrust of escalators over elevators have made matters difficult for human beings to hold heavy items in their palms, for example even as buying in malls, sporting heavy research device among more than one flooring of a university, and so on. In such cases, the usage of traditional trolleys will be heavily reduced and will persist with baskets and different hand-carriable strategies. even as this method would possibly paintings for light objects, it'll show to be a tedious one whilst heavy items are considered. for this reason, in these circumstances, there is a want for a much easier and relatively effortless method to move the gadgets among extraordinary flooring. on

this proposed layout, we've designed a trolley that can be used to transport things on flat surfaces as well as stairs and different irregular surfaces without the need for the user to apply extreme forces, with better pressure distribution on the trolley average; which could reduce the probabilities of failure; and a lighter creation that might allow the burden capability of the trolley to be multiplied.

RESEARCH OBJECTIVES

This assignment aims in growing a mechanism for clean transportation of heavy load over stair.

-It also eases the motion of trolley in abnormal floor like holes and bumps.

-help the person to move the items by way of the usage of hydraulic jack gadget on trolley

-Use stable tyre -may be used on any type of surface.

-Use hydraulic jack to transport up and down.

PROJECT DEFINITION

A tri-wheel trolley is a kind of trolley outfitted with rotating wheels or tracks so that it could be pushed or pulled up or down steps or a stairway. Tri-wheel trolley also may be guide or use hydraulic jack to move up and down effortlessly, and usually determined in wheel, music, push arm or walker variations.

2. PROBLEM STATEMENT

1.2 PROBLEM STATEMENT

Trolley is gadget used to move heavy masses from one place to any other. it could reduce the human burden in their every day lives.

This tool is commonly used by a massive wide variety of industries to move physical merchandise. trolleys are frequently used by people who organize and inventory products in retail shops restock. when used well, trolley can guard people from having again injuries and different fitness issues that may result from lifting and sporting heavy hundreds. In a everyday trolley model, a few troubles had been recognized. including Lot an attempt is needed to alter the inclination of the hand truck for offer stable transportation of the masses. as a result of operator receives out of control whilst mountaineering the steps, the incident will occur due to the load roll again. those vehicles have a pair of floor enticing wheels which wear fast because of the heavy load bearing downwardly at once at the wheels

3.LITERATURE SURVEY

gadgets consisting of hand trolleys are used to relieve the strain of lifting at the same time as on flat floor; but, those devices usually fail in relation to carrying the load over quick height. numerous designs have been conceived that could permit a non-commercial hand trolley to travel over stairs, curbs, or uneven terrain whilst reducing the stress on the consumer. In our mission the trolley is consisting the tri-wheel or tri- star mechanism eases the motion of trolley in abnormal surfaces like holes, bumps, and so on.

ADVANCED MATERIAL HANDLING TROLLEY USING TRI-WHEEL MECHANISM

They introduced about in developing a mechanism for clean transportation of heavy masses over uneven terrain. The need for one of these gadget arises from necessities in our society. devices including hand trolleys are

used to alleviate the strain of lifting at the same time as on flat floor; but, these gadgets typically fail with regards to sporting the weight over short peak. numerous designs were conceived that might allow a non-commercial hand trolley day-to-day tour over stairs, curbs, or choppy terrain at the same time as lowering the strain at the consumer. in this they concluded some barriers concerning the energy and constructed of the structure, day-to-day be taken into consideration every day be a small leap forward, as a ways as Stair hiking motors are worried. at some point of the take a look at run of this undertaking, it become found out that it wouldn't be a terrible concept every day remember this layout for wearing heavy masses up the steps.

DESIGN AND MANUFACTURING OF A STAIR CLIMBING VEHICLE

this text offers with the designing and production of a vehicle, which can climb stair or pass along very hard surface. The technical problems in designing of this car are the stability and pace of the automobile while hiking stairs. inside the initial design, each wheel contained frame, a solar wheel and three planetary wheels. The planetary wheel changed into related with the sun wheel thru an loafer. The purpose of the use of the idler become to rotate the planetary wheels in the equal course of solar wheel. each planetary wheel turned into aligned in a directly line with idler and solar wheel. Planetary wheels were 120° aside from each different.

DESIGN AND MANUFACTURING OF SIX WHEEL STAIRCASE TROLLEY

in this they introduce a brand new horizon for the transportation of the hundreds over the stair. maximum of the buildings of the us of a are structurally congested and unavailing of elevator

facility so it is tough and hard to raise up heavy loads. The stair climbing trolley can play an important role in the ones areas to raise loads over a brief height, like libraries, health facility, and in production region. the primary characteristic of this trolley is to carry load no longer only on table platform however also on stair case. it can flow on flat surface uniformly at 20 rpm with none fluctuation.

DESIGN AND FABRICATION OF A STAIR CLIMBING HAND TRUCK

In this article the design and manufacturing of a stair hiking hand truck has been offered. The automobile is designed in the sort of manner that it is able to climb a stepped course (like stairs) with its changed wheel shape. however off-the road, their performance may be very depending on the typical size of encountered limitations that have to be conquer in a preferred motion mode. From the take a look at run of the car it became seen that the most peak the automobile should climb the stair whose inclined perspective was forty four $^\circ$ maximum. If the inclination is extra than forty four $^\circ$ it might fail to climb the stair. in this they concluded that in the test run of this challenge, it become found out that it might capable of carrying heavy load without suffering any deformation or nearby fractures if it might go into actual global manufacturing at a great scale.

DESIGN AND FABRICATION OF STAIR CLIMBING HAND TRUCK

This subject matter deals with the designing and production of a hand truck, that could climb stair with less effort evaluate to carry it manually. The technical troubles in designing of this vehicle are the stableness and pace of the car while hiking stairs. the usage of of this car, the labour value may be reduced as well

as massive quantity of hundreds may be transferred uniformly with much less energy consumption

4. OBJECTIVE

- This project is in developing a mechanism for easy transportation of heavy load over stair.
- It also eases the movement of trolley in irregular surface like holes and bumps.
- Help the person to move the items by using hydraulic jack system on trolley.
- Use solid tyre -Can be used on any type of surface
- Use hydraulic jack to move up and down.

5. WORKING

- They brought about in growing a mechanism for smooth transportation of heavy hundreds over uneven terrain. The need for this type of machine arises from 66b34c3da3a0593bd135e66036f9aef3 requirements in our society. devices along with hand trolleys are used to alleviate the strain of lifting whilst on flat ground; however, these devices normally fail when it comes to sporting the load over quick peak.
- in this they introduce a brand new horizon for the transportation of the masses over the stair. maximum of the homes of the country are structurally congested and unavailing of elevaeverydayr facility so it is every day and arduous to lift up heavy hundreds.
- The stair hiking trolley can play an vital function in the ones areas to boost hundreds over a quick height, like libraries, sanatorium, and in creation region. the primary function of this trolley is to hold load now not most effective on desk platform however also on stair case. every dayeveryday flow on flat floor uniformly at 20 rpm without any fluctuation.

In thisnewsletter the layout and production of a stair mountaineering hand truck has been presented. The vehicle is designed in the sort of manner that it can climb a stepped route (like stairs) with its changed wheel shape. but off-the street, their efficiency is very dependent on the everyday length of encountered barriers that should be triumph over in a widespread motion mode.

1. This topic deals with the designing and production of a hand truck, which can climb stair with much less attempt examine to hold it manually 1. on this they concluded that during the check run of this venture, it changed into realized that it would able to wearing heavy load without struggling any deformation or nearby fractures if it would go into real global manufacturing at a super scale.

6. ADVANTAGES

- 1.They make it simpler on the way to pass heavy hundreds upstairs and downstairs
2. It easily levers your load on the stair case and takes the pressure off as you do not should absolutely lift the trolley from one step to the next.
- 3.It helps reduce the stress to your frame that you would in any other case experience in case you have been to boost the heavy bags upstairs or downstairs
4. often humans experience decrease back damage as well as different discomforts from lifting heavy hundreds upstairs stair climber trolleys relieves you from such discomforts and accidents.
5. lessen human attempt (pulling trolley than carryings item) -time for wearing things is minimized -easy to use (it may be without difficulty climbs up

steps or kerbs cloth choice is a step in the method of designing any physical item

6. inside the context of product layout, the main intention of material choice is to minimize price whilst assembly product overall performance dreams.

Systematic choice of the excellent material for a given application begins with houses and prices of candidate substances.

7. DISADVANTAGES

1. due to normal single-wheel layout, it's harder to bypass choppy terrain or climb stairs.
2. Lifting everyday trolley up or down the stairs additionally time-consuming. fabric of everyday trolley often to be metallic, this could cause the product heavy and now not very portable

8. APPLICATIONS

1. It enables lessen the stress to your body that you would in any other case enjoy in case you have been to boost the heavy bags upstairs or downstairs.
2. lessen human effort (pulling trolley than carryings object) -time for sporting things is minimized -clean to use (it could be without difficulty climbs up steps or kerbs material selection is a step in the manner of designing any physical item.
3. It helps lessen the strain in your frame which you might in any other case experience if you had been to boost the heavy luggage upstairs or downstairs.

10. CONCLUSION

1. it may be taken into consideration to be a small breakthrough, as a long way as Stair mountain climbing cars are worried

2. This project had a few obstacles regarding the energy and built of the structure.
3. throughout the take a look at run of this task, it become found out that it wouldn't be a horrific idea to recall this design for wearing heavy loads up the stairs
4. This product could be nicely acclaimed if it can be commercialized to in shape the wishes.

REFERENCES

- [1] International Journal of Recent Research in Civil and Mechanical Engineering (IJRCME) Vol. 2, Issue 2, pp: (160-165), Month: October 2015 – March 2016. By Mulik Shrinivas, Salunkhe Rohit, Shaikh Shahrukh, Waghmode Dada, Swapnil Gaikwad B.E Students, 5th prof Mechanical Department, S.B. Patil College of Engineering, Indapur, India
- [2] International Conference on Industrial Engineering and Operations Management Dhaka, Bangladesh, January 9 – 10, 2010. By Md. A. Hossain. Nafis, A. Chowdhury, Rubaiat I. Linda, and Shamiuzzaman Akhtar. Department of Mechanical Engineering MIST, Dhaka-1216, Bangladesh
- [3] International Journal of Research Publications in Engineering and Technology [IJRPET] ISSN: 2454-7875 Special Issue, Sept. 2015. By Bhanje V.C., Alzende S. S., Gulik A.T., Kale A. A. Department of Mechanical Engineering, Vidya Vikas Pratisthan Polytechnic, Solapur/MSBTE
- [4] India Research and Reviews: Journal of Engineering and Technology. Vol.2 April- June 2013. By Avinash V Gaikwad, and Sandip J Kadam Department of Mechanical Engineering, Jawaharlal Darda Institute of Engineering and Technology, Yavatmal, Maharashtra
- [5] International Journal of Emerging Trends in Engineering and Development Issue 3, Vol.5

(September 2013). By Mr. Pratik H. Rathod, Mr. Ravi R. Mishra, Mr. Nitin A. Waghmare

[6] Siegwart, R., Lauria, M., Mäusli, P., Winnendael, M., 1998, "Design and Implementation of an Innovative Micro-Rover," Proceedings of Robotics 98, the 3rd Conference and Exposition on Robotics in Challenging Environments, April 26-30, Albuquerque, New Mexico.

[7] Hsueh-Er, C., "Stair-climbing vehicle, 2008, " Patent No. US2008164665(A1)", Jan 24.

[8] Mourikis, A.I., Trawny, N., Roumeliotis, S.I., Helmick, D.M., and Matthies, L., 2007, "Autonomous Stair Climbing for Tracked Vehicles," International Journal of Computer Vision & International Journal of Robotics Research - Joint Special Issue on Vision and Robotics, 26(7), 737-758.

[9] Helmick, D., Roumeliotis, S., McHenry, M., Matthies, L., 2002, "Multi-sensor, high speed autonomous stair climbing", IEEE/RSJ Conference on Intelligent Robots and Systems (IROS), September.

[10] Burdick, J.W., Radford, J., and Chirikjian, G.S., 1993, "A 'Sidewinding' Locomotion Gait for Hyper Redundant Robots," Proc. IEEE International Conference on Robotics and Automation.

[11] Desai, R.S., Wilcox, B., Bedard, R., 1992, "JPL Robotic Vehicle Overview," in AUVS.

[12] McTamaney, L.S., Douglas, B.D., Harmon, S.Y., 1989, "Mars Rover concept development," Proc. SPIE Conf. 1007, Mobile Robots III.

[13] Siegwart, R., Lauria, M., Mäusli, P., Winnendael, M., 1998, "Design and Implementation of an Innovative MicroRover," Proceedings of Robotics 98, the 3rd Conference and Exposition on Robotics in Challenging Environments, April 26-30, Albuquerque, New Mexico

[14] Hsueh-Er, C., "Stair-climbing vehicle, 2008, " Patent No. US2008164665 (A1)", Jan 24.

[15] "Senthil Kumar.G, Anoop C Abraham, Anandhagobi.A, Dinakar.S "Design and Fabrication of Stair Climbing Trolley" International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056, p-ISSN: 2395- 0072, Volume: 05 Issue: 03 | Mar-2018

[16] V. B. Bhandari, Design of machine elements – Revised edition, India, 2006.

[17] Pratik R. Baviskar, Aniket V. Naik, Ganesh B. Payghan, Abhijit P. Sarkar, Santosh P.Joshi "Design, Analysis and Fabrication of Automated Staircase-Climbing Load Carriage" International Journal of Scientific & Engineering Research Volume 8, Issue 5, May-2017 1434,ISSN 2229-5518-IJSER.

[18] A S Shriwaskar and S K Choudhary "Synthesis, Modeling, Analysis and Simulation Of Stair Climbing Mechanism" ISSN 2278 – 0149, Vol. 2, No. 4, October 2013. IJMERR.

[19] Snehita Kilari, Tara Sasanka C, K.G.S.V.Manikanta "Design and Finite Element Analysis of Disc Brake with different materials for passenger car" 2018 IJRTI | Volume 3, Issue 8 | ISSN: 2456-3315.

[20] Md. A. Hossain. Nafis A. Chowdhury, Rubaiat I. Linda, and Shamiuzzaman AkhtarDhaka, "Design and Manufacturing of a Stair Climbing Vehicle" Proceedings of the 2010 International Conference on Industrial Engineering and Operations Management, Dhaka, Bangladesh, January 9 – 10, 2010.