

Multipurpose Wheelchair

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Abstract: *The objective of the project was to develop a low-cost multipurpose wheelchair aimed at enhancing mobility and improving the quality of life for individuals experiencing difficulty in walking. The tool enables the patient to be lifted directly from the bed, thereby assisting in the reduction of pressure injuries. In addition to lowering costs, the intention was to diminish pressure injuries and falls through the use of our device. The wheelchair can be utilized both indoors and outdoors, adding to its multipurpose functionality. Upon completion of the project, the goals were successfully achieved. In the wheelchair, what was aimed for has been accomplished. A superior multipurpose wheelchair with all necessary safety features has been created. Secure data transfer is enabled through low-cost, high quality measures.*

Keywords: Adjustable Height, Foot rest, Bed

I. INTRODUCTION

Thousands of families around the world have experienced the impact of disability. Presently, approximately 650 million individuals worldwide live with disabilities, with nearly 21.9 million people in underdeveloped countries like India facing some form of disability. Despite their challenges, these individuals must rise every day, morning, and live life to the fullest. For most, achieving this is only possible with the assistance of a wheelchair, a gadget that can empower and enable a disabled person to lead a normal, independent life. Wheelchairs have undergone significant progress over time, evolving from manual to motorized forms. However, these wheelchairs have not fully met the demands of people with disabilities. Hence, it is vital to recognize the problems faced by disabled individuals and design wheelchairs to address their needs. The working principle of a multipurpose wheelchair centers around its adaptability, versatility, and user friendliness. It encompasses several key components and features. The wheelchair's frame can be adjusted and customized to accommodate various seating positions, heights, and configurations, ensuring maximum comfort and support for the user.

Research Problems - Expensive Wheelchair designs are present in the market. - Injuries may occur to the patient while handling (transferring) the patient from wheelchair to the stretcher.

Research Objectives and Importance - Low cost of the mechanism that we have built due to less electronics and basic design. - The wheelchair can be converted anytime, anywhere into the stretcher and transferring of the patient can be avoided.

II. LITERATURE SURVEY

1. Ravi Teja Ch.V, P Shekar, S. Roja, H. Hariprasad proposed a system which aids an assistance for physically handicapped ones those who are not able to move by themselves. It uses speech recognition by interfacing speech recognition kit(HM2007) with microcontroller and wheelchair. The system provides a Mic for the user to give commands HM2007 registers the commands and fed them to microcontroller. Motor driver drives the wheel chair according to the commands from microcontroller.

2. Prof. Miss. Pranita Bhosale, Mr.Akshay Satpe, Mr. Tapan Singha introduces a concept useful for people with loco-motor disability. Here wheel chair is controlled by eye movement and voice commands. Eye movement is detected by using a head mounted camera. Corresponding output signals fed to motor which control wheel chair movement. Voice assistance is also used by this system. By giving commands the movement can be controlled



3. Mohammad Ilyas Malik, Tanveer Bashir put forward a wheel chair system controlled by voice of the person. The goal of this system is to assist the physically challenged people. It uses speech recognition technology by which voice can be realized and organized with smart phone device as an intermediate interface. It also uses an obstacle sensor to detect the hurdles in between wheel chair in the way of its direction. A DC motor creates the movement of wheel chair

4. Prof. Manoj V Bramhe, Navya Vijay, K. Bhagyasree Rao, Payal Bisen, Riddhi Navsalkar design a system that operates on users voice commands. This voice controlled wheel chair helps them to drive the wheel chair without any one's help. This system can be controlled by users simple voice commands. According to the direction specified in commands, wheel chair moves. Speech recognition is done here by using a speech recognition module.

III. WORKING PRINCIPLE

The working principle of a multipurpose wheelchair centers around its adaptability, versatility, and user friendliness. It encompasses several key components and features. The wheelchair's frame can be adjusted and customized to accommodate various seating positions, heights, and configurations, ensuring maximum comfort and support for the user.

IV. DESIGN

2.1 Galvanized pipe: Galvanized steel pipes are manufactured using a process known as galvanization, whereby molten zinc is added to the pipe steel, thereby adding an additional layer to the steel pipe and imparting qualities and advantages over conventional steel pipes



Fig no :-1

2.2 Plywood: Manufacturers produce plywood by gluing together thin layers, or "plies," of wood veneer with adjacent layers, rotating their wood grain up to 90° to one another. Plywood belongs to the family of manufactured boards, which comprises medium-density fiberboard (MDF), oriented strand board (OSB), and particle board (or chipboard).



Fig no :-2

2.3 Wheels: Wheels are basically used to give a smooth drive to any of mechanism wheels are of mainly two type 1st Alloy wheel 2nd spokes wheel but as we solving the problem of budget the spokes wheels are cost effective and for bigger diameter normally in wheelchair spokes wheels are used as these wheels have a fixed path but as in case of wheelchair the small wheels are used of alloy steels or fiber as these wheels give direction to the wheelchair.





Fig no :-3



Fig no :-4

V. OBJECTIVE

- To prepare a design of wheelchair for a disabled person with maximum specification and additional we add a store box in which the person can keep their necessary things.
- Wheelchairs provide mobility, postural support and freedom to those who cannot walk or have difficulty walking
- To design and fabricate a wheelchair cum bed capable of providing mobility to a paralytic attack patient or people with disabilities to move independently without the help of an external person.
- To equip the wheelchair with health care monitoring system such as blood pressure and heart rate monitoring sensors. Arduino is used to control the operations.
- To comfort the Wheelchair turning into bed for the patient with more features than an ordinary wheelchai
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VI. ADVANTAGES

1. Increase in comfort level of the patient
2. Prevents further damage to patients and the helper while transferring him/he from chair to bed vice- versa.
3. Patients with serious injuries need not be moved to aggravate their injuries even more.
4. No special training required to operate them.
5. More efficient than other chairs

VII .APPLICATIONS

1. It can be used in hospital.
2. It can be used in houses.

IX. FUTURE SCOPE

The scope of improvement in mobility and patient transport solutions in healthcare settings is encompassed by a wheelchair-cum-stretcher. It is characterized by functioning as both a wheelchair and stretcher, thereby enhancing accessibility and efficiency in hospitals, clinics, and emergency services. Furthermore, it is designed to cater to users with diverse needs, rendering it a valuable tool for healthcare professionals and caregivers.

From this project, we designed and fabricated a better multipurpose wheelchair for the shifting of patients from bed to stretcher and vice versa with an affordable amount that will be more suitable in the Indian scenario. Analyses were done on wheelchair through both theoretically and practically.

X. CONCLUSION

The allocation of patients from bed to wheelchair is an exhausting job for caretakers. As of paralyzed patients may get obese, we are handling them will become a life threatening challenge for a person. As reports points out the number of injuries occurred to the caretakers while shifting patients, is very high. Even if there is highly advanced equipment, it is highly expensive beyond common patients can't afford. So we have come up with a budgeted advanced three in one wheelchair, with screw and nut mechanism. Which is quite cheap to build and easy maintenance.

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