

Design and Fabrication of Modern Vehicle System for Differently Abled Persons

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Abstract:- Mobility of physically disabled persons is a concerning social issue nowadays. Various hand driven tricycles, wheelchairs, retrofitted vehicles etc. are commonly available for disabled people as a mode of transportation. The basic Tricycle is a three-wheeled design, pedaled by disabled persons in the side and seat in the middle for sitting arrangement. They use only one hand to steer the handle because other hand is used to rotate the pedal. The primary aim of this proposed work is to Design and fabrication of modern vehicle system for differently abled persons those who don't have hands. Here the controlling of vehicle operation is mainly depends upon legs where the acceleration and braking controls are directed by legs. In presence, there are some vehicles available for the differently abled persons can be operated through hands alone. This project MODERN VEHICLE SYSTEM (MVS) for differently abled person, is fully focussed on the vehicle operations through legs.

INTRODUCTION:

Disability could be cause by injuries sustained mainly from motor accidents or during turnkey project work or in manufacturing industries as well those caused naturally. Due to the enormous number of disabled people in the society, a wheelchair tricycle has been fabricated and designed to specification. In response to demand of wheelchair user for equal access, hand-propelled wheelchair, electrically controlled wheelchair, and automated guided wheelchair have been developed. However, because upper body strength is required, a hand propelled wheelchair does not permit a person without hand on extensive range of travel. The design of this tricycle is an improvement on the existing ones.

HISTORY

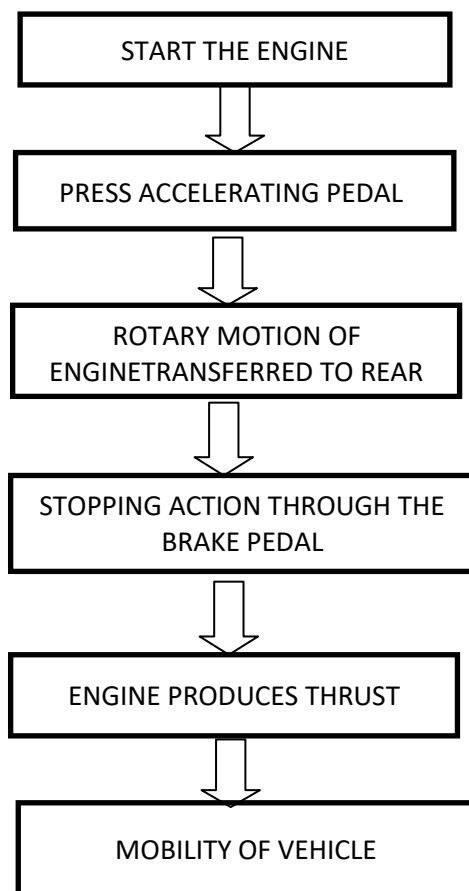
A three-wheeled wheelchair was built in 1655 or 1680 by a disabled German man, Stephan Farffler, who wanted to be able to maintain his mobility. Since he was a watch-maker, he was able to create a vehicle that was powered by hand cranks.

In 1789, two French inventors developed a three-wheeled vehicle, powered by pedals; They called it the tricycle.

In 1818, British inventor Denis Johnson patented his approach to designing tricycles. In 1876, James Starley developed the Coventry Lever Tricycle, which used two small wheels on the right side and a large drive wheel on the left side; power was supplied by hand levers. In 1877, Starley developed a new vehicle he called the Coventry Rotary, which was "one of the first rotary chain drive tricycles." Starley's inventions started a tricycling craze in Britain; by 1879, there were "twenty types of tricycles and multi-wheel cycles ... produced in Coventry, England, and by 1884, there were over 120 different models produced by 20 manufacturers." The first front steering tricycle was manufactured in 1881 by The Leicester Safety Tricycle Company of Leicester, England, which was brought to the market in 1882 costing £18. They also developed a folding tricycle at the same time.

WORKING PRINCIPLE OF MVS:

The basic thing of the vehicle is the transportation purpose for the differently abled persons. To accelerate the vehicle, the user just needs to press the accelerating pedal and further the engine produces the power and transmits to rear axle which inturns moves the vehicle. The steering and braking control is going to be done by the legs with the help of the steering rod and braking pedal which presents nearby to the accelerating pedal. Finally, the mobility has been done through the above operations just by the working power of legs.

WORKING FLOW CHART OF MVS:**COMPONENTS:**

The components that are used in the project are as follows

- 1. Engine**
 - i. Carburetor
 - ii. Starter motor
 - iii. Dual throttle cable
- 2. Tricycle**
 - i. Wheels
 - ii. Axle
 - iii. Pedals
- 3. Brakes**
- 4. Chain Sprockets**
- 5. Battery**
- 6. Wiring Components**
- 7. Fasteners**

CONSTRUCTION OF MVS:

Initially the steering rod is attached to the front wheel. The accelerating pedal and brake pedal got fixed on both sides of the steering rod. Engine is located at the bottom of the driver seat. Fuel tank is fixed beside the

driver which supplies fuel to engine. The chain transmission system fixed to transfer the engine power to the rear axle by means of chain and sprocket.

STEERING CONTROL:

The steering actions in this vehicle system are done through the steering rod which is reliable according to the users need. The braking and accelerating system in the form of pedals is incorporated along with the steering rod. These steering rod is fixed to the front wheel of the vehicle so that the user can steer the wheel by his legs according to their needs.

POWER SYSTEMS:**Engine:**

This is the main component used in the vehicle which is responsible for the power source to the mobility of the vehicle system. In this system, the 80cc engine is used which is reliable for the real time applications.

Self starter:

Self-starter is used to start the engine and this switch is also provided near to the steering rod .

TRANSMISSION SYSTEM

In this vehicle system ,the transmission of power is carried through the sprocket chain mechanism. The output power of the engine is fed to the rear axle through this mechanism which leads to easy and simple in constructions.

START AND STOP ACTIONS:

The start and stop performance is done through the accelerating and braking pedals respectively. The limiting knob is also provided in the accelerating pedal for the purpose of not to cross the excess speed. The braking pedal is placed on the other side which is used for the stopping actions.

FABRICATION PROCESS

Fabricating processes are the steps through which raw materials are transformed into the final product. The fabrication process begins with the creations of the materials from which the design is made. These materials are then modified through fabricating processes to become the required product. The fabricating process can also includes grinding, shaping, drilling and welding the materials. The fabricating process also includes tests and checks for quality assurance during or after the fabricating and planning the production process. As the metal is used as a platform for the vehicle so the metal cutting, welding and grinding processes are don.

CUTTING AND GRINDING PROCESS

In these process the metal sheets and rods are cut and desired modifications and arrangements are carried out also the grinding process done for the best surface finish by removing the excess metals.

DRILLING ACTIONS:

Drilling process is also accessed in these operations for the purpose of attachment of the engine, brake pedal and the accelerating pedal.

WELDING ACTIONS:

With the help of the arc welding process the metal pieces are welded at front wheel base plates and rear axle.

APPLICATIONS

- The main usage of this vehicle is, it provides an easy transportation to the differently abled persons who doesn't have hands.
- It can be used for both indoor and out door purposes and used as same as normal commercial vehicle.

CONCLUSION

Thus the vehicle is used at most for the differently abled persons and also it is more economical. This vehicle also reaches a good usage in real time applications.

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PHOTOGRAPH OF MVS:

