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Reverse Motion Setup for Two-Wheeler of Physically Challenged People

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Abstract: In India physically challenged people are not provided with dedicated transport facilities by both public and private organizations, in spite of this many physically challenged people transport with vehicles (two wheelers) made for a normal person integrated with a retro fit setups to aid them handle those vehicle like their normal counterparts, still they face difficulties in driving those vehicles and sometimes look for help of others for handling them. one of such scenario is the shortcoming of two-wheelers of physically challenged people to drive backward. It is easy for a normal human to move back a two-wheeler but it is much hard for a physically challenged one to do the same, So we thought of designing a reverse motion mechanism to move the two-wheeler back when required to avoid unnecessary U-turns and to move vehicle from narrow places like from parking without others hands to rely on. this project incorporates a electric motor coupled to both the supporting wheels of the two-wheeler of physically challenged people using a chain and sprocket drive, powered by a lead acid battery and controlled by rocker switch and a push button to operate the two wheeler in reverse by the user. It replaces the conventional gear box mechanism which is prone to more wear and tear and requires modification of power train.

I. INTRODUCTION

This project aims to help the handicapped people for their easy convenience for travelling. They are facing many problems related to their transportation. Presently, handicapped people drive two wheelers with extra support wheels and they face difficulty in reversing the vehicle while travelling by using this mechanism. The handicapped people cannot easily move the vehicle backward at present. There is no system available to back the vehicle. At times when the front wheel gets into a trench it is very difficult to take the vehicle from parking. Even normal people face much problem to take the vehicle out of the parking at that time. In case of the handicapped people who drive two wheelers with extra support wheels, face much problem to take the vehicle out of the parking by pushing the vehicle with legs as we do. In order to take the vehicle out of the parking they need to seek others help or they should push it out of the parking. The project is carried out in a very simple way to reduce the efforts of challenged people to move two-wheeler backward. A dc motor with required specifications is used to rotate the extra side wheels in the kit attached to the chassis. The supply from the dc battery is controlled by using a momentary switch and a push button. The parts used in this project can be classified into mechanical and electrical components. The mechanical component used is chain sprocket with required specifications. The motor is connected to the sprocket through chain. As the motor starts rotating in reverse direction the wheel also starts to rotate in the same direction. The operation is quite easy and user friendly. The kit can be installed in any model with least or no modifications. Apart from other existing projects this proposed project is based on an entirely different way. There is nothing complicated and hazardous in this project.

A. Need for the project

- 1) To eliminate the partiality and complexity nature over the handicap peoples from the society.
- 2) To improve the tendency and ability of challengers to live with confidence and without considering the illness and disability of them.
- 3) To get back the hopeful of handicap to show the strength of them to society.
- 4) To eliminate the effort required for taking the vehicle backward.

B. Objectives and scope of work

- 1) To find a easiest and simplest method for reverse motion
- 2) To boost the confidence level of challenged people
- 3) To reduce the difficulties to drive on any surface

- 4) To provide a good riding experience
- 5) To ensure the safety of the person
- 6) Minimum and least modifications to install the mechanism

II. BLOCK DIAGRAM

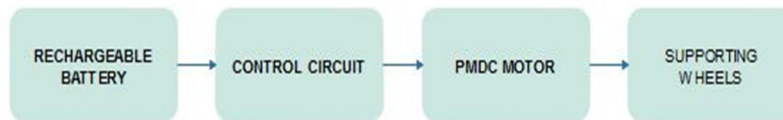


Fig.1 Block Diagram

III. COMPONENTS DESCRIPTION

A. Mechanical Components

- 1) *Chain and Sprocket*: A sprocket or sprocket-wheel is a profiled wheel with teeth, or cogs, that mesh with a chain, track or other perforated or indented material. The name 'sprocket' applies generally to any wheel upon which radial projections engage a chain passing over it. It is distinguished from a gear in that sprockets are never meshed together directly, and differs from a pulley in that sprockets have teeth and pulleys are smooth. Sprockets are used in motorcycles, bicycles, cars, tracked vehicles, and other machinery either to transmit rotary motion between two shafts where gears are unsuitable or to impart linear motion to a track, tape etc.,
- 2) *Input/driver sprocket*: Sprocket which is attached to the motor shaft transfers the power to the driven sprocket or output sprocket through the chain. Number of teeth determines the speed at which sprocket rotates. Speed ratio is calculated by using the number of teeth in both front and rear sprockets.
Number of teeths-16
- 3) *Output/driven sprocket*: Rear sprocket or driven sprocket, which is attached to the side wheels to drive the wheel in forward or reverse direction. The number of teeth on the drive sprocket is determined to produce required output speed and torque.
Number of teeths-46
- 4) *Roller Chain*: Chain drive is a way of transmitting mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle, particularly bicycles and motorcycles. It is also used in a wide variety of machines besides vehicles. Most often, the power is conveyed by a roller chain, known as the drive chain or transmission chain, passing over a sprocket gear, with the teeth of the gear meshing with the holes in the links of the chain. The gear is turned, and this pulls the chain putting mechanical force into the system.

B. Electrical Components

- 1) *Permanent Magnet DC motor*: A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic to periodically change the direction of current flow in part of the motor.
- 2) *Momentary Push Button*: A push-button or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing, hitting, and punching.
- 3) *Switch*: In electrical engineering, a switch is an electrical component that can "make" or "break" an electrical circuit, interrupting the current or diverting it from one conductor to another. The mechanism of a switch removes or restores the conducting path in a circuit when it is operated. It may be operated manually, for example, a light switch or a keyboard button,

may be operated by a moving object such as a door, or may be operated by some sensing element for pressure, temperature or flow

- 4) **Battery:** The storage battery or secondary battery is such battery where electrical energy can be stored as chemical energy and this chemical energy is then converted to electrical energy as when required. The conversion of electrical energy into chemical energy by applying external electrical source is known as charging of battery. Whereas conversion of chemical energy into electrical energy for supplying the external load is known as discharging of secondary battery.

IV. WORKING

When the user i.e. the physically challenged person encounters a situation to move the two-wheeler reverse in places like parking bay, narrow roads etc. the user has to first turn on the rocker switch which is provided for the intention of safety which avoids accidental operation of dc motor during forward operation. Then the user has to operate the momentary push button to actuate the DC motors mounted on the frame beside both the supporting wheels which supplies energy from batteries and rotates the motor shaft which is coupled to a roller chain drive and the two supporting wheels, this transmits the power from the DC motor to the rear wheels with required speed reduction, which in-turn rotates the supporting wheels and moves the two-wheeler in reverse. The user may stop the vehicle from releasing the momentary push button which stops the motor rotation but still the wheels rotate due to inertia and applying rear wheel brakes will bring the vehicle immediately to stop.

V. CIRCUIT DIAGRAM

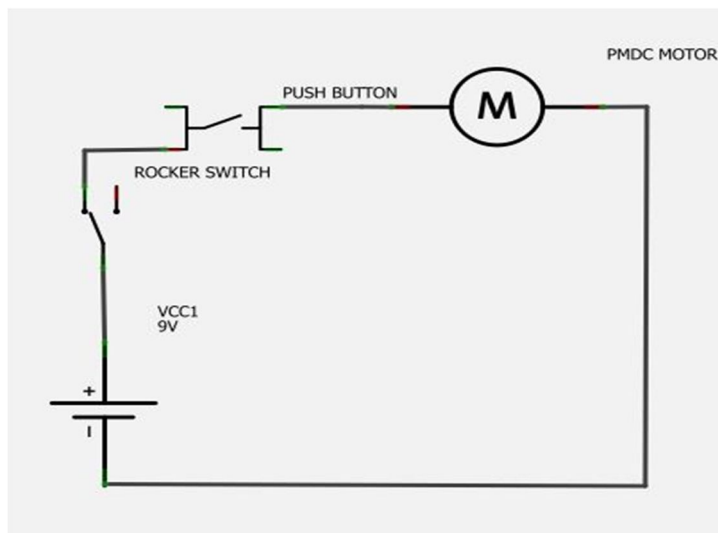


Fig. 2. Circuit Diagram

VI. CAD MODEL

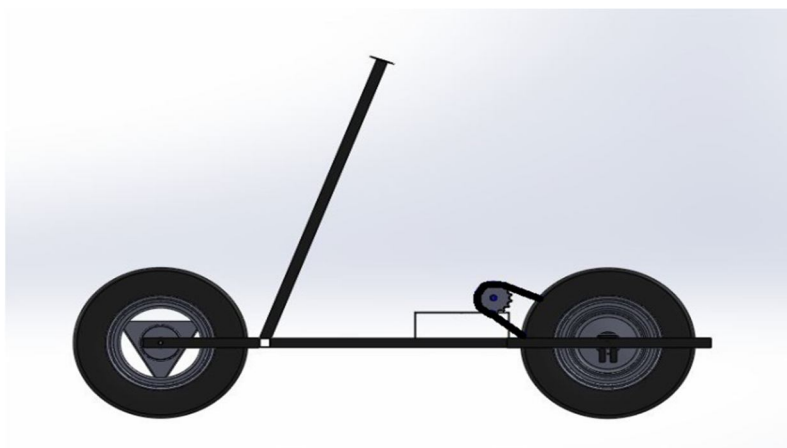


Fig. 3. Left Side View

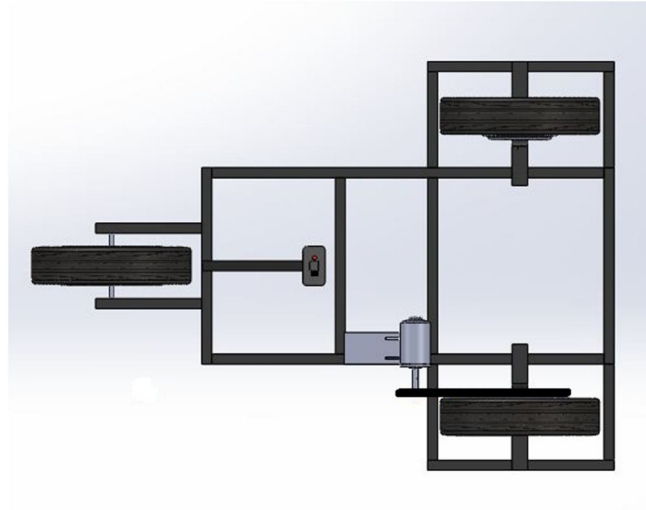


Fig. 4. Top View

VII. APPLICATION

- A. Physically disabled persons can independently move and turn the vehicle from parking and other small roads.
- B. Provides more freedom of operation of two-wheelers for physically challenged people.

VIII. CONCLUSION

This project thereby eliminates the prevailing issues of physically challenged people who has a two-wheeler, it provides them power to operate two-wheelers without the aid of other person, it provides more maneuverability to those two wheeler driving physically challenged people which in-turn support them both physically and morally to operate independently in the society. This project may also be extended in future to not only aid them during reverse operation but also to contribute to maintain good fuel economy and performance of IC engine by parallel operation.

IX. FUTURE SCOPE

- A. Can be upgraded as a mid drive electric drive kit.
- B. Can aid the conventional engine in climbing hills.

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