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Reverse Gear Motion in Physically Challenged Vehicle

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Abstract: ***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. Incase 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. As a help to them we have designed a gear box which will be fit to the vehicle without altering the existing gear box. The paper deals with the design of such a gear box and the assembly process of the gear box to the vehicle. The design deals with the conditions of the gear box operation, and the design of the gear box based on easy assembly and easy manufacturing at low cost. In the present scenario there were no mopped vehicles equipped with reverse gear facility. So it is very difficult for a handicapped person while the vehicles front wheel gets into a trench as well as in the case of parking. Here introducing a reverse gear mechanism, with portable gear box that can be easily operated by hand. Four gears are used for obtaining re-verse motion of the vehicle. In this paper, proposes and designed a gear box which will be fitted into those vehicles without much altering the existing transmission system. This reverse gear mechanism provides a simple, low cost reverse transmission system which will be helpful for handicapped people.***
keywords: Gear box, Transmission system, Reverse motion, Handicap, Mopped vehicle

I. INTRODUCTION

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. As a help to them we have designed a gear box which will be fit to the vehicle without altering the existing gear box. It is fitted to the side of the vehicle and helping in the backing of the vehicle. When the driver wants to move the vehicle backward what he needs is just to move the rod in the newly designed gear box in one direction and when the driver wants the vehicle to move in the forward direction, then the rod is to be moved to the earlier position they are facing many problems related to their transportation. Presently, handicapped people drive two wheelers with extra support wheels they face difficulty in reversing the vehicle while travelling by using this mechanism the handicapped people can easily move the vehicle backward.

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II. LITERATURE REVIEW

People who have problem in their physics feel so difficult to move from one place to another. The introduction of some automobile vehicles with three wheels partially fulfils the requirement of handicap for their convenient driving in roadways. But such types of vehicles also need a much range of high effort from challengers to ride in road ways.

The main major drawback of such type of automobile vehicles is it can't be able to provide a suitable driving mechanism during turnings and parking.

So it may result in more effort with skid. And also such types of vehicles are only suitable for specialized case persons whether they must have problem in only leg or ear.

III. BLOCK DIAGRAM

Fig.1

Fig.2

Fig.3

IV. WORKING PRINCIPLE

A gear train is a mechanical system formed by mounting gears on a frame so that the teeth of the gears engage. Gear teeth are designed to ensure the pitch circles of engaging gears roll on each other without slipping, providing a smooth transmission of rotation from one gear to the next. The transmission of rotation between contacting toothed wheels can be traced. The implementation of the involutes tooth yielded a standard gear design that provides a constant speed ratio. This set of gear is used for transmission. This gearbox is provided between the clutch and sprocket shaft. In this project the gear box contains the gear and

pinion which is keyed to the corresponding shaft. Both gear and pinion material is steel. The speed reduction ratio of the gear and pinion. Helical gears offer a refinement over spur gears. The leading edges of the teeth are not parallel to the axis of rotation, but are set at an angle. Since the gear is curved, this angling causes the tooth shape to be a segment of a helix. Helical gears can be meshed in *parallel* or *crossed* orientations. The former refers to when the shafts are parallel to each other; this is the most common orientation. In the latter, the shafts are non-parallel, and in this configuration the gears are sometimes known as "skew gears. The above figure indicates the placing of the gear box. The lever is used to reverse the vehicle which is attached to the gear box.

V. COMPONENTS OF VEHICLE

A. Wheel Assembly (Supporting Wheels)

As a construction, the wheels consist of hubs, discs or spokes, rim, tyre and tube. The vehicles cannot move without wheels. The wheels support the whole weight of the vehicle and protect the vehicle from the roads shocks whereas the rear wheels move the vehicle, the front wheel steer it. All the wheels must resist the braking stresses and withstand the side thrust.

B. Function Of Wheel Assembly

1) Able to grip the road surfaces.
2) Flexible to absorb the road shocks.
3) Perfectly balance dynamically.
4) Strong enough to withstand the weight of the whole vehicle.

C. Tyre assembly

The assembly of the tyres and tubes with air is a cushion element. The tyre is the outer cover of the assembly. This assembly mounted over the wheel rim. The air inside the tubes carries the entire load and provides the cushion.

D. The Tyre Are Used For Following Purposes

1) To support vehicle load.
2) To provide cushion against shocks.

E. Suspension System

Suspension system of an automobile separates the wheel and axle assembly of the automobile from its body. Main function of the suspension system is to isolate the body of the vehicle from shocks and vibrations generated due to irregularities on the surface of roads. Shock absorbers are provided in the vehicles for this purpose. It is in the form of spring and damper. The suspension system is provided both on front end and rear end of the vehicle.

VI. DESIGN OF THE GEARBOX

A. Concept

The engine drives provides the power to the gear box and the gear box gives out the power to the rear wheel in two directions. When the output is in clockwise direction the vehicle moves forward and when the output is in counter clock direction the vehicle moves backward. Thus the reversing of the vehicle can be achieved

B. Conditions That The Gearbox Possess

The gear box is of a simple design, The gear box is easily fitted to the vehicle, The speed of the output is not altered, where as the speed of the vehicle in the reverse direction is reduced much and it has high torque, so we are considered a speed reduction of 4 times when compared with the forward mode for the same throttle position, The changing of gear is also handy.

C. Design Process

In order to possess the required conditions a sliding mesh gearbox is designed with the following important components

1) Gear A
2) Gear B

3) Gear C
4) Gear D
5) Gear E

VII. GENERAL CALCULATION

Gear ratio can be calculated by the following formula =
Number of teeth in driven gear /Number of teeth in driver gear
Input gear GA= 68 teeth
Output gear GB = 32teeth.
Compound idler gear
G11= 22 teeth G12= 18 teeth
For Forward direction,
The gear ratio =driven/driver
= TA / T12
= 68 / 18
= 3.77
Gear ratio = T11 / TB
= 22 / 32
= 0.687
Overall gear ratio =3.77 x 0.687
= 2.58
For every 1 revolution of an input gear, the output gears turn
2.58 revolutions
For Reverse direction,
Input gear (GA) is meshed with the output gear (GB)
Gear ratio = TA / TB
= 68 /32 = 2.12
For every one revolutions of the input gear, the output gear turns 2.12 revolutions

VIII. GEAR RATIO

The gear ratio of a gear train, also known as its speed ratio, is the ratio of the angular velocity of the input gear to the angular velocity of the output gear. The gear ratio can be calculated as directly from the numbers of teeth on the gears in the gear train. The torque ratio of the gear train, also known as its mechanical advantage, is determined by the gear ratio. The speed ratio and mechanical advantage are defined so they yield the same number in an ideal linkage. Also it will provide a lot of comfort and safety while driving. So, implementing our project will surely provide mobility to all disabled people without any help from others.

IX. ADVANTAGES

A. It improves the safety.
B. It is more comfortable to the physically disabled person.
C. Easy to U-turn the vehicle.
D. Easy to handle the vehicle.
E. It gives more confidence to physically challengers.
F. It reduces the time for physically challengers.
G. It improves the guidance level for physically challengers.
H. It gives great confidence level for physically challengers.
I. It is much more reliable design for physically challenged persons.

X. APPLICATION

A. It is used to eliminate the partiality and complexity nature over the handicap peoples from the society.
B. It is used to improve the tendency and ability of challengers to live with confidence and without considering the illness and disability of them.
C. It is used to get back the hopeful of handicap to show the strength of them to society.
D. It is provide a better convenient chariot ride feel while driving in roadways to physical challengers.

XI. CONCLUSION

A disability is a condition or function judged to be significantly imparted differentiation of an individual from the group. Current issues and debates surrounding disability include social rights and citizenship of them. In the developed countries the debate has moved beyond a concern about the perceived cost of maintaining the dependent people and to find effective ways of ensuring the people to contribute in all spheres of life activities. Measuring the developments which are happened in automobile technology is incredibly difficult. So through this project work, we interlink these two things and try to solve the problem as more as efficient with our knowledge .We hope that the launching of our vehicle in our Indian road ways would give a pleasurable development to physical challengers which may result in unity. Initially the gearbox was designed as assistance for the handicap people but it seemed that it is a much needed technology for all kinds of people. Since this technology is being liked by all, this advancement in two wheeler will be new experience in driving and this will be a comfort for the driver. Thus the comfort of reversing can be achieved in two wheelers also without any difficulty.

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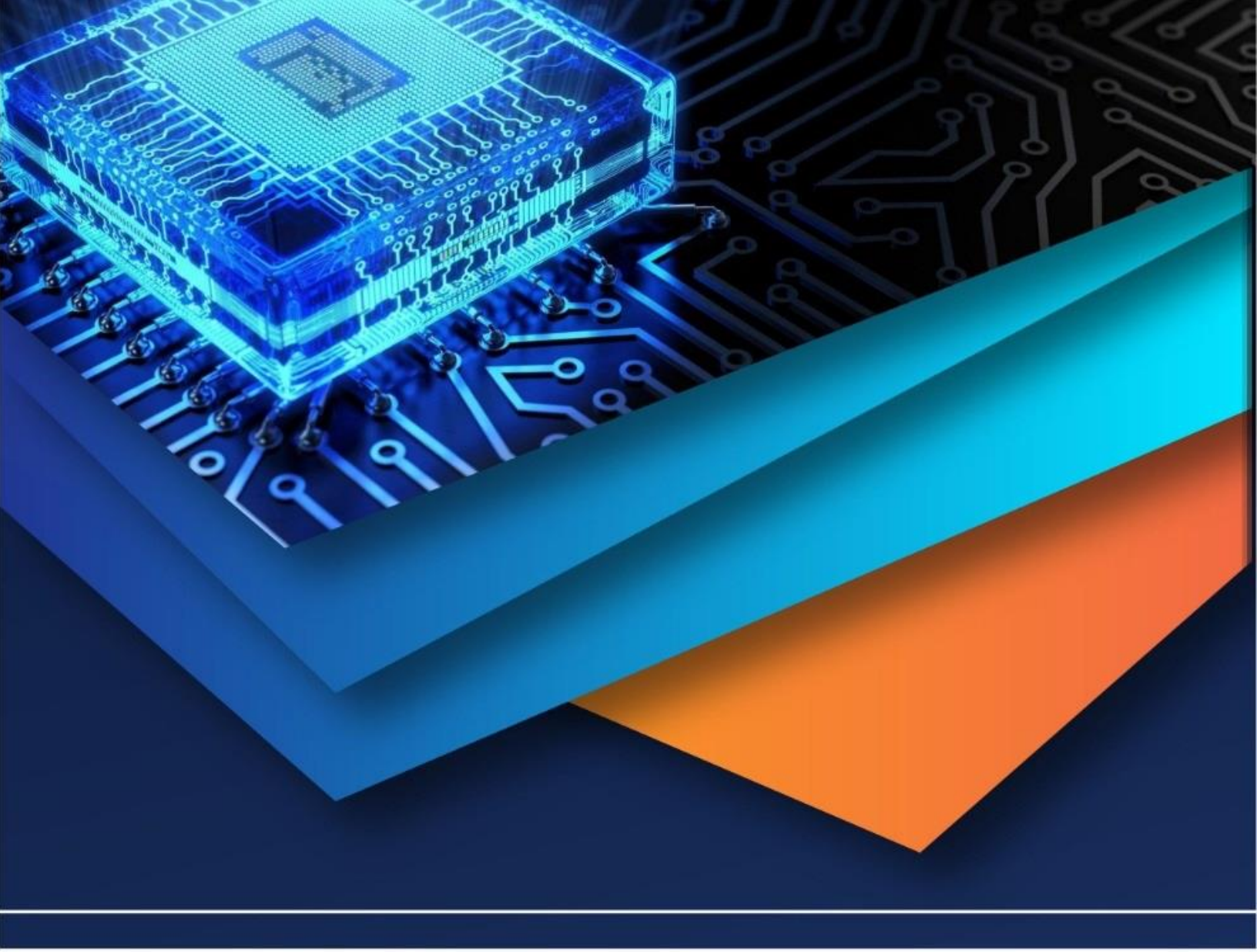

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