REVERSE GEAR MECHANISM IN TWO WHEELERS FOR PHYSICALLY HANDICAPPED PEOPLE

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Abstract: In our society there are many handicapped people suffering with difficulties in mobility. In the case of handicapped people using motorcycles, the reversing of their vehicle had been a persistent issue and one of the most difficult tasks for them. Generally, they ask for help from the public to reverse their vehicle as and when required but most of them will try the maximum to avoid such situations to occur. Globally, only a few heavy motorcycles manufacturers have successfully incorporated reverse motion in their models for user convenience and they don’t come cheap. So the most of the handicapped are left astray due their heavy price tags and can’t afford such motorcycles. Hence, a motorcycle with reverse motion at cheapest price is the need of the hour for the physically challenged people. This inspired our team to implement a reverse motion arrangement to one of the most frequently used motorcycles to reach out to the masses. Here the reverse motion arrangement is applied to the motorcycles with a simple gear drive and it had been introduced to the gearless motorcycle as they are the most commonly used by handicapped people. The gearless motorcycles are attached with two rear wheels for avoiding the balancing problem faced by handicapped people. The attachment of this arrangement is on the rear side of the motorcycle in between the two rear wheels such that this gearbox will not make any disturbance to other parts of the vehicle. This gear arrangement has single lever operated functionality for changing gears in forward and reverse motion in order to ensure the easiness of the drive for handicapped peoples.

1. INTRODUCTION

Throughout recent history, the use of motorcycles has become widespread. And different varieties of motorcycles are using in worldwide. The different variants of motorcycles are super bikes, chopper bikes, gearless scooters, scooters etc. And some of these motorcycles are light and others are heavy. By using motorcycles like choppers bikes it is so heavy to handle, mainly difficulty to take reverse. So in order to solve this problem the chopper bike manufacturers decided to implement reverse motion to the bikes with the help of DC motors, chain sprockets etc. But in ordinary motorcycles the reverse motion facilities are not introduced. They bike companies are only focusing on the performance characteristics, and the profit.

In our society we saw many of handicapped people are suffering due to their difficulties. In the case of handicapped people who are using...
motorcycles the reversing of their vehicle is one of the most difficult task facing by them. They ask for help to the public to reverse their vehicle when needed and most of them will try maximum to avoid the situations to reverse the vehicle. In worldwide only the heavy motorcycles have reverse motion and it is costly, so the most of the handicapped people cannot buy these motorcycles. The handicapped people need a motorcycle with reverse motion at cheapest price. So here our team decided to implement a reverse motion arrangement to the motorcycles. In this main project we decided to develop a reverse gear arrangement to solve their problem. The reverse motion arrangement is applied to the motorcycles with a simple gearbox. And here the gearbox will firstly introduce to the gearless motorcycle it is because gearless motorcycles are commonly used by handicapped people. The gearless motorcycles are attached with two rear wheels for avoiding the balancing problem facing by handicapped people. The attachment of gearbox is on the rear side of the motorcycle in between the two rear wheels and this gearbox will not make any disturbance to other parts of the vehicle. The gearbox has a single lever operated compact unit, it is easy to operate.

2. SPECIFICATIONS OF VEHICLE

<table>
<thead>
<tr>
<th>Engine displacement</th>
<th>98.00cc</th>
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<tbody>
<tr>
<td>Engine type</td>
<td>Air cooled 2 stroke</td>
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<tr>
<td>No of cylinders</td>
<td>1</td>
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<tr>
<td>Valves per cylinder</td>
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</tr>
<tr>
<td>Max power</td>
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<tr>
<td>ps@5600 RPM</td>
<td></td>
</tr>
<tr>
<td>Max torque</td>
<td>9.8</td>
</tr>
<tr>
<td>Nm@5000RPM</td>
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</tr>
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</table>

Bore *Stroke
49.0*52.4mm

Fuel used petrol
Starter Electric and kick

3. COMPONENTS AND DESCRIPTION

*Driver Wheel
*Driven Wheel
*Idle gears
*Sheet Metal
*T-shaped Lever
*Bearing with Bearing Cap

DRIVER WHEEL
Driver wheel is the gear which give drive to the entire gearbox. It is connected to the shaft from the engine of the vehicle which provide the driving power.

DRIVEN WHEEL
Driven wheel is the gear that is driven by the driver wheel with the help of idle gears. It is fixed on the shaft which rotates the vehicle wheel.

IDLE GEAR
These gears help in the forward and backward motion of the vehicle. They also transmit power from the driver wheel to driven wheel.

IDLE GEARS (FIG1)

SHEET METAL
It is a 50mm thickness iron sheet of 200mm X 200mm area on which the gearbox is arranged.

BEARING WITH BEARING CAP
It is provided for the easy rotation of the shaft on which the driven shaft is fixed and this shaft rotates the vehicle wheel. It is welded on the sheet metal.

T-SHAPED LEVER
It is a lever in the shape of T which provide the forward and backward direction to the vehicle. When the lever is pulled downwards on 3 gears are meshed so vehicle move in forward direction, when the lever is pulled upwards 4 gears are meshed so the vehicle move in backward direction.

FORWARD MOTION OF THE VEHICLE
In the first case when the lever is in normal condition then there are 2 wheels and one pinion is meshed together which provide the forward direction to the vehicle. In this 3 gears are meshed together as a result the tyre will move in the direction that is provided by the engine.

REVERSE MOTION OF THE VEHICLE
In the second case that is the reverse motion, the T lever is pressed upwards as a result instead of 3 gears, 4 gears are meshed together here that is 2 wheels and 2 pinions are meshed. As a result of this 4 gear the motion of the vehicle is changed from forward to reverse motion. Motion of the tyre will be the opposite direction of that of engine.

6. ADVANTAGES OF THIS SYSTEM
* Our system provide a reverse gear to the vehicle so it become easier for the handicapped people to drive.
* This system provide a safety drive to the customer as it has 2 additional wheels provided to it, it will also increase the confidence of the driver.
* The arrangement is made in such a way that it is more comfortable to the driver than any other two wheelers.
* It help the driver to reverse the vehicle in the case if he/she has crossed away the path that he/she want to go, in other cases they have no chance to reverse the vehicle as a common driver can either they have to find a new way or need to take u turn which are difficult for a handicapped people.
* Another advantage of this system is that it helps to take the u turns easily for a handicapped person which is usually difficult for such persons to do so. These are the main advantage of our reverse gear mechanism System.
7. FUTURE SCOPE

* This system can be used in any kind of two wheelers

* Irrespective of size and shape of vehicle, this system can be used.

* The weight of this system is around 7 kilograms, in future it can be made of aluminium alloys which can reduce the weight of the system.

* In this system the T lever is made of different pieces of mild steel and joined by welding in future it can be made from single piece.

* In this mechanical lever is used for the changing gear in future pneumatic system can be used.

* In this Greece is used as lubricant so the efficiency of the system is affected by the loss caused by friction, in future the gear box can be closed and filled with oil so the loss due to friction will be reduced.

* By the use of closed gear box filled with oil can reduce the sound produced by the spur gear.

8. CONCLUSION

Here we conclude that our project is very much helpful for physically disabled. The gearbox is compact, easy to operate and maintain. This is cheapest unit that affordable for handicapped people. This project is a trial and error method, by expanding it to a commercial model, we believe that it is much more helpful for them. The services and maintenances can done in almost any two wheeler workshops.

REFERENCES


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