DESIGN AND FABRICATION OF REVERSE MECHANISM IN TWO WHEELER

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ABSTRACT

*In fast growing modern world many types of vehicles are being innovated. But until now it is a major problem for the physically challenged peoples to move back the vehicles and to "U" turn the vehicles. Even to a small distance they cannot move the vehicles backside. So To eliminate this problem we invent the reverse gear mechanism in two wheeler. The challenged peoples can easily reverse the vehicles without getting down from the vehicle by easily operating hand lever. The project title is "REVERSE GEAR MECHANISM IN TWO WHEELER ". The main objective of our project is to facilitate 'comfort ability and safety' to the challenged peoples. This project requires the motor vehicle, lever, reverse gear box, v-belt, sprocket and other necessary parts. When need to reverse the vehicles they can engage the hand lever for reverse gear, the vehicle moves backwards. This project will be more useful for the challenged peoples in the society***.**

KEYWORD: *Spur gear, forward,reverse gear mechanism,handicapped, vehicle*

1.INTRODUCTION

The aim of the projects is to produce a "Reverse Operation in Handicapped Vehicle". By using this vehicle, they can easily move the vehicle towards back and front easily. By using the lever they can change the direction of the vehicle.India is the second largest producer of two-wheelers in the world. In the last few years, the Indian two-wheeler industry has seen a spectacular growth. The country stands next to China and Japan in terms of production and sales respectively. Majority of Indians, especially the youngsters prefer motorbikes instead of cars. Capturing a large share in the two-wheeler industry, bikes and scooters cover a major segment. Bikes are considered to be the favourite among the young generation as they aid in easy commutation. A wide range of two wheelers is available in the market, many of them boast of the latest technology and enhanced mileage. Indian bikes, scooters and mopeds represent style and class for both men and women in India. A reverse gear mechanism in a vehicle gear transmission having a first shaft, a second shaft, and gear trains associated with the first and second shafts for transmitting the torque from one of the first and second shafts to the other. The reverse gear mechanism includes a reverse drive gear supported on the first shaft, a reverse driven gear supported on the second shaft, and an idle gear assembly interposed in meshing relation between the reverse drive and driven gears. The idle gear assembly is composed of a third shaft, a first idle gear supported on the third shaft and meshing with the reverse drive gear, a second idle gear supported on the third gear and meshing with the reverse driven gear, and a clutch unit interposed between the first and second idle gears for limiting the torque transmitted between the first and second idle gears to a prescribed value. The components of the power transmission mechanism can be designed reasonably and advantageously.

2.SELECTION OF VEHICLE

Modification in vehicle can be made in following bikes which fulfills the aims of our projects.

TVS Max R 100

The other forms of bikes like sunny, Kinetic Honda, Honda active, Kinetic 2k, Scotty pep which has a rear engine and mono block aluminum molding can't support the welding modification which are needed by us.

TECHNICAL SPECIFICATION OF TVS Max 100 Engine

	2 stroke single cylinder
Bore x Stroke (mm)	50 x 50
Displacement (cc)	100
Max. power	7.9 Ps@ 5000 rpm
Torque (Nm)	9.8 nm @3750 rpm
Fuel type	Petrol
Brake Drum	
Front (mm)	80 dia
Rear (mm)	110 dia
Suspension	
Front	telescopic hydraulic shocks absorbers
Rear	Telescopic absorbers
Dimensions	
Wheelbase	1217mm
Over length	2057mm
Overall width	725mm
Overall hight	1053mm
Ground clearance	140mm
Kerb weight	106kg.

3.COMPONENTS DESCRIPTION

GEARS

Gears are wheels with teeth. Gears mesh together and make things turn. Gears are used to transfer motion or power from one moving part to another.

- To reverse the direction of rotation
- To increase or decrease the speed of rotation
- To move rotational motion to a different axis
- To keep the rotation of two axis synchronized.

3.1 SPUR GEARS

Spur gears or straight-cut gears are the simplest type of gear. They consist of a cylinder or disk with the teeth projecting radially, and although the teeth are not straight- sided (they are usually of special form to achieve constant drive ratio, mainly involute but less commonly cycloidal), the edge of each tooth is straight and aligned parallel to the axis of rotation. These gears can be meshed together correctly only if they are fitted to parallel shafts

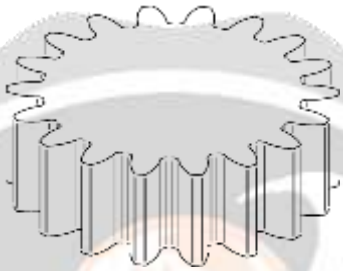

Fig 1 Spur gear

Spur gears are gears in the same plane that move opposite of each other because they are meshed together. Gear 'A' is called the 'driver' because this is turned by a motor. As gear 'A' turns it meshes with gear 'B' and it begins to turn as well. Gear 'B' is called the 'driven' gear.

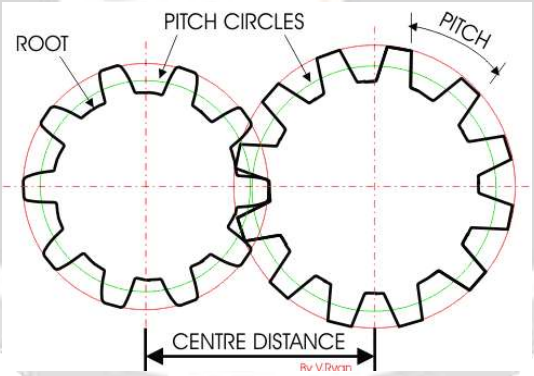

Fig 2 Spur gears

The circle marked in red shows the outer limit of the teeth whilst the green circles are known as the pitch circles. The pitch circle of a gear is very important as it is used by engineers to determine the shape of the teeth and the ratio between gears (ratios will be explained later).The pitch of a gear is the distance between any point on one tooth and the same point on the next tooth. The root is the bottom part of a gear wheel.

4. GEARTERMINOLOGY

The gear terminology is explained below with reference to a spur gear which is a particular type of a gear. The detail of gear terminology is also indicated in fig

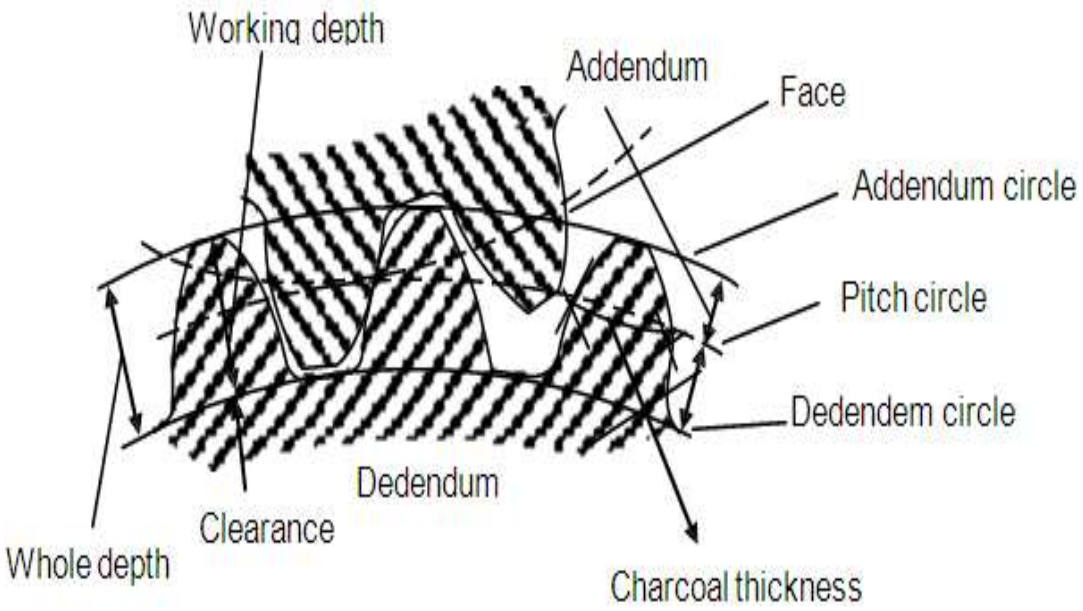

Fig .3 GearTerminology

Gear Blank

The metallic workpiece accurately sized and shaped which is used as workpiece for gear cutting is called gear blank. The diameter of gear blank is called gear blank diameter.

Addendum Circle

It is an imaginary circle which passes through top of all gear teeth and represents maximum diameter of a gear. This maximum diameter is equal to gear blank diameter.

Addendum

Addendum of a gear is the radial distance between addendum circle and pitch circle of the gear.

Pitch Circle

This is an imaginary circle along which thickness of a gear tooth becomes equal to spacing between them.

Root Circle

Root circle is an imaginary circle which is supposes to pass through root of all gear teeth.

Tooth Clearance

This is the distance between the top of a tooth of one gear and the bottom of the corresponding tooth of other mating gear is known as clearance or tooth clearance.

Pressure Angle

The angle made by the line of action with the common tangent to the pitch circle is called pressure angle.

Face

It is the portion of the tooth lying between top of the tooth and pitch circle.

Flank

This is portion of the gear tooth between its pitch circle and root circle.

Thickness of a Gear Tooth

It is also called chorodal thickness of gear tooth. It is width of two gear tooth measured along the pitch circle. At the pitch circle width of gear tooth becomes equal to the width of spacing between two consecutive gear teeth.

Backlash

It is difference between actual tooth thickness and the width of space at which it meshes with other gear.

Circular Pitch

It is the distance between corresponding points of adjacent teeth measured along the pitch circle.

Diametric Pitch

It is number of teeth of a gear per unit of pitch circle diameter.

Diametral pitch (p) = N/d

Where 'N' is the number of teeth 'd' is the pitch circle diameter.

LEVER

A lever is a simple machine consisting of a beam or rigid rod pivoted at a fixed hinge, or fulcrum. A lever is a rigid body capable of rotating on a point on itself. On the basis of the location of fulcrum, load and effort, the lever is divided into three types. It is one of the six simple machines identified by Renaissance scientists. A lever amplifies an input force to provide a greater output force, which is said to provide leverage. The ratio of the output force to the input force is the mechanical advantage of the lever.

Fig.4 Lever

SHAFT

A shaft is a rotating machine element, usually circular in cross section, which is used to transmit power from one part to another, or from a machine which produces power to a machine which absorbs power. The various members such as pulleys and gears are mounted on it.

Fig.5 Shaft

TYPES OF SHAFT

They are mainly classified into two types.

- Transmission shafts are used to transmit power between the source and the machine absorbing power; e.g. counter shafts and line shafts.
- Machine shafts are the integral part of the machine itself; e.g. crankshaft.

5.WORKING PRINCIPLE

Normal two wheeler gear transmission to transferring the power from driver shaft to drive shaft directly which is rotating at only clockwise direction.So vehicle moving at forward direction only. Here we introducing reverse gear mechanism for move forward and reverse direction.

Fig.6 DISENGAGEMENT

The reverse gear is attached in between driver shaft and driven shaft with help of lever. A two wheelers move forward when the power is directly transmits to the driven shaft to driving shaft.

Now vehicle can move reverse direction when we insert a small gear is called reverse gear. This gear is to change the normal direction to opposite direction on engaging the reverse gear.

Fig.7 ENGAGEMENT

Engaged Pisition

So vehicle moves backward if we reject a reverse gear vehicle will be moves at regular forward direction when reverse gear on disengage.

6.ADVANTAGES AND APPLICATIONS

ADVANTAGES

- No external power required
- Eco friendly
- Anyone can easily operate

APPLICATIONS

When implemented this system we can use all type of two wheeler vehicles.

7.CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding planning, designing, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries. We are proud that we have completed the work with the limited time successfully. We are able to understand the difficulties in maintaining the tolerances and also quality.

8.FUTURE SCOPE

The one step ahead to ours implementation in the reverse gearing is may this application can be apply over in switch. Now here we using the leaver to change the reverse direction for engage and disengage the gear instead of may be in switch for engaging and disengaging the gear.

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