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SHAFT DRIVEN BICYCLE

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ABSTRACT

The main aim of our project is to innovate new transmission system in bicycles to overcome disadvantages of existing bicycles. Basically in bicycle the power is transmitted by chain sprocket mechanism. But in this case only 81% of power is transmitted to the rear wheel, while the remaining 19% is lost. And in such case lubrication is required. In shaft driven bicycle a drive shaft can deliver 94% efficiency and it has more consistence performance.

KEYWORDS: *Shaft driven bicycle, Bevel gear, Shaft drive.*

I. INTRODUCTION

The word shaft drive itself implies that transmission of power is done with the help of shaft. The drive shaft transmits the power from the pedal to the rear wheel for the forward movement of bicycle. Shaft drives were invented over a decades ago, but it was not possible to implement the shaft drive in the bicycles due to the fix gear ranges. Now a day its possible due to the advancement in the gear technology. The shaft-driven bicycle uses a large bevel gear where a conventional bike would have its chain ring. This meshes with another bevel gear mounted on the drive shaft as shown in fig.

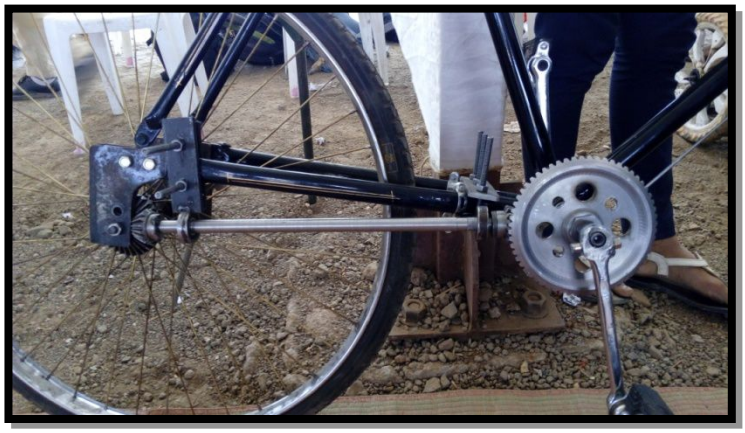

Fig.1: Shaft driven bicycle

The only use of bevel gears allows the power and torque to be transmitted from the pedals to be turned in 90°. On the rear end, shaft has another bevel gear which is in mesh with gear at rear hub where the rear sprocket is mounted in a conventional bicycles.Thus, the transmission takes place with the help of bevel gear.

II. 2. LITERATURE REVIEW

2.1 Introduction

First shaft driven bicycles were invented in 1890, in USA and England.the shaft drive carries the torque and subjected to torsion and shear stress,which is the difference between input force and load. Shaft driven bicycle uses a shaft as an alternative to chain sprocket mechanism to transmit power. The purpose of this invention is to provide a bicycle having means of linear transmission for better efficiency than prior bicycle. Number of problems are associated with traditional bicycle chains. To overcome the associated problems we have designed a bicycle which is driven by shaft and bevel gear.

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III. OBJECTIVE OF SHAFT DRIVEN BICYCLE :

i. Increase the durability of bicycle.
ii. Power transmission efficiency is increased.
iii. Fluctuations are absent.
iv. Elongation of chain is overcomed.
v. As there is no need of chain length, there is no need chain adjuster.
vi. The accidential cases causes by chain can be avoided and protect the from chain grease.
vii. The common problem in chain drive of getting jammed is totally avoided in shaft drive.

IV. 4. COMPONENTS SHAFT DRIVEN BICYCLE :

4.1 PEDAL :

When a rider pushes the pedal with their foot the bicycle is propelled. It provides the connection between the riders foot or shoe and the crank is allowed to turn the bottom bracket spindle and propels the bicycle.

4.2 BRAKES :

Brakes are controlled by pulling levers on handle bars, which force brake blocks against wheel rim to slow the bicycle down.

4.3 MUD GUARD :

A covering of metal in curved shape to apart of wheel to protect the rider from being splashed.

4.4 TYRES :

Fitted on a metal wheel rim which gives smooth and quiet ride over a small bumps.

4.5 WHEEL HUB :

Wheel hub is a center part of bicycle wheel from which spokes radiates. It consist of a bearng, an axle and hub shell.

4.6 DRIVEN SHAFT :

Drive shaft takes the place of chain sprocket. The power is transfer to the rear wheel as the pedals are connected to the drive shaft by bevel gears and the bicycle is propel.

4.7 BEVEL GEAR :

In bevel gears the axes of the two shafts intersect and the tooth bearing faces of gear are conical in shape.

Fig. : Bevel gear

Bevel gears are mounted on a shafts that are 90^{o} apart, but they can also be designed to work at other angles.The purpose of this gear is to transmit the power and torque from one point to another point.

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V. TROUBLESHOOTING

During abnormal vibrations or noises in the drive shaft, the following chart can be used to help diagnose possible causes.

Problem	Caused by	Remedies
Vibration at speed	High speed	Maintain low speed
Gears pitch circle is not coincide	Improper alignment	Align the gears properly
Gear backlash	Excessive loading,Overheating	Go through design characteristics

Table 6.1 : Troubleshooting

VI. ADVANTAGES AND LIMITATION

6.1 ADVANTAGES:

i. High mechanical efficiency.
ii. Reliable and durable.
iii. To get 1: 2.5 output ratio.

6.2 APPLICATION :

i. Used for racing purpose.
ii. Can be used for off road cycling.

VII. CONCLUSION

Our project is aimed to reduce wastage of human power on bicycle riding which is achieved by using light weight driveshaft with bevel gear on replacing chain transmission. To convert rotary motion into linear motion by use of bevel gear. To make the transmission of power easier and smooth with help of bevel gear and shaft arrangement instead of chain and sprocket mechanism.

VIII. FUTURE SCOPE

We can implement this mechanism in bikes with the help of slip joint by connecting one end of drive shaft to the output of gearbox shaft and other end with the bevel gear to drive the rear wheel.

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