

## High Speed Effortless Bicycle

Shubham Dhekle<sup>1</sup>, Dayanand Chimegave<sup>2</sup>, Amrut Admile<sup>3</sup>, Prof. Amol Yadav<sup>4</sup>

<sup>1</sup> (Mechanical Department, Dr. D. Y. Patil Institute of Engineering and Technology, Pune, Maharashtra, India

<sup>2</sup> (Mechanical Department, Dr. D. Y. Patil Institute of Engineering and Technology, Pune, Maharashtra, India

<sup>3</sup> (Mechanical Department, Dr. D. Y. Patil Institute of Engineering and Technology, Pune, Maharashtra, India

<sup>4</sup> (Assistant Professor, Mechanical Department, Dr. D. Y. Patil Institute of Engineering and Technology, Pune, Maharashtra, India

**ABSTRACT:** In recent year various vehicle introduced in market but due to limitation in carbon emission and BS Series limited speed availability vehicle in the market and causing of environment pollution over few year There is need to decrease dependency on fuel vehicle. bicycle is to be modified for optional in the future To implement new technique using change in pedal assembly and variable speed gearbox such as planetary gear optimise speed of vehicle with variable speed ratio. To increase the efficiency of bicycle for comfortable drive and to reduce torque applied on bicycle. we introduced epicyclic gear box in which transmission done through Chain Drive (i.e. Sprocket) to rear wheel with help of Epicyclic gear Box to give number of different Speed during driving. To reduce torque required in the cycle with change in the pedal mechanism.

**Keywords:** Epicyclic Gear Box, Pedal Arrangement, Variation In Speed, efficiency.

### I. Introduction

In automobile system, gearbox play important role in shifting of gear. A cycle is local means of transport no of cycle available in market Bicycle, Tricycle. Most cycle Rickshaws used to carry Passengers for hire this vehicle used in southern Asia and south Asia generally rickshaws are provided for recent immigrant from the rural areas for the work. generally impoverished men various locally made cycle used for transportation, in an eco-sensitive zone where there is increasing green house effect, Global Warming effect due to ban of highly emitted vehicle cycle is basic use for transportation. But in the cycle has many shortcoming, cycle has less advantage, due to less efficiency extra effort (i.e. torque) applied on the pedal while Gradient, to improve the efficiency of bicycle planetary gear box can be used.

Planetary gear consists of planet gear, sun gear, and Ring gear. Planetary gearing or epicyclic gearing consist of one or more outer gear, or planet gear rotate about central or sun gear. By adjusting Pedal crank mechanism or rotation of pedal in given rotation transmission of gear through sprocket to rear axle of wheel we adjust various speed ratio according to requirement.

### II. Literature review

Generally the studies of gearbox made in the automobile technology, To Provide the comfortable drive in cycle lever principle is provided to pedal mechanism in which high speed ratio is available at output. In world daily million of vehicle introduced on road. due to petrol-diesel consumption of vehicle, rate of carbon emission increases tremendously, at every span of 2-3 year environment summits invited in countries for debating reduction of carbon emission in developing countries also in market price of crude oil increases inherently, high speed effortless cycle introduced to reduce dependent on petrol-diesel vehicle, high speed effortless cycle will introduce in future

### III. Proposed Methodology

This system is been designed with lever mechanism i.e. stated that two equal force acting in opposite direction i.e. (clockwise or counter clockwise) and applied to uniform lever to equal distance from fulcrum counter each other and established state of equilibrium. with applying lever principal to pedal and epicyclic gear box there is increase speed.

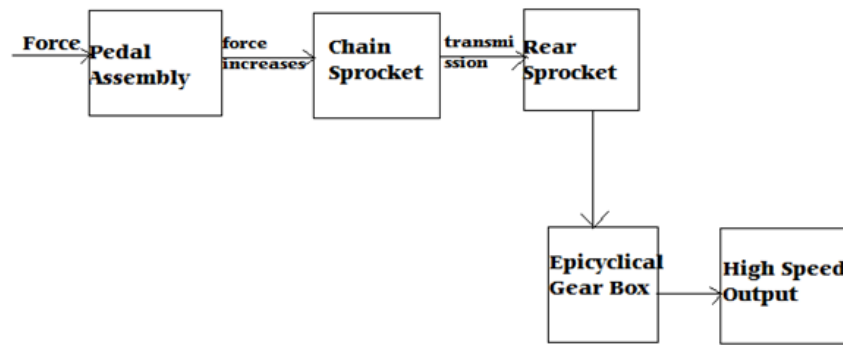


Fig. 1. Block diagram Of High Speed Effortless Bicycle

When brake pedal is pressed it force transmitted to slotted Strip provided in bicycle pedal which is pivoted at one end near pivoted restriction of connecting rod to increase the torque acting on pedal of bicycle. Slotted part is provided for crank rotation over pedaling of bicycle connected to chain sprocket. Hollow tube section is provided to utilize maximum power during pedaling and maximum force transmitted to sprocket which is rigidly supported at pedal-crank mechanism supporting rod is fixed at end of one end, two bearing is provided for rigidly supported gear and sprocket clamped on fixed supporting rod. Chain mechanism is shifted to spur gear for transmission of torque. spur gear has large advantage over other gear due to simple design, have a high power speed efficiency, highly reliable, transmit large amount of power up to 50000kw.sprocket helps to transmit torque applied on brake pedal to rear wheel of bicycle at end of rear wheel epicyclical gear box is provided on the rear axle where epicyclical gear box consist of sun gear. Ring gear and planet gear. Efficiency of sprocket of bicycle up to 98.5% therefore there will be less friction factor and torque transmission to rear axle is maximum and power available at output is maximum. while bicycle climb on gradient torque required is maximum and speed goes on decreasing to increase speed during gradient epicyclical gear box is provided as per driving speed needed while driving gear shifting in epicyclical gear box to obtain variable speed output.

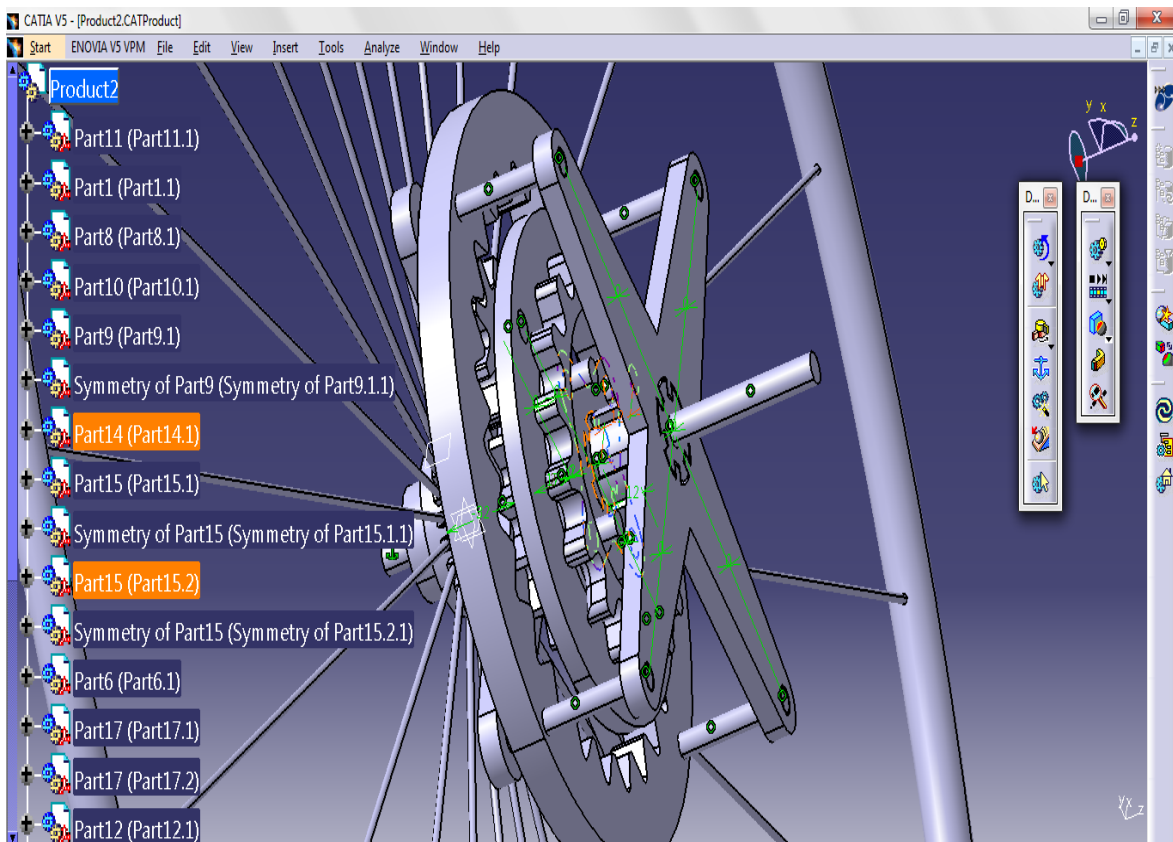


Fig-2 Modeling of planetary gear box

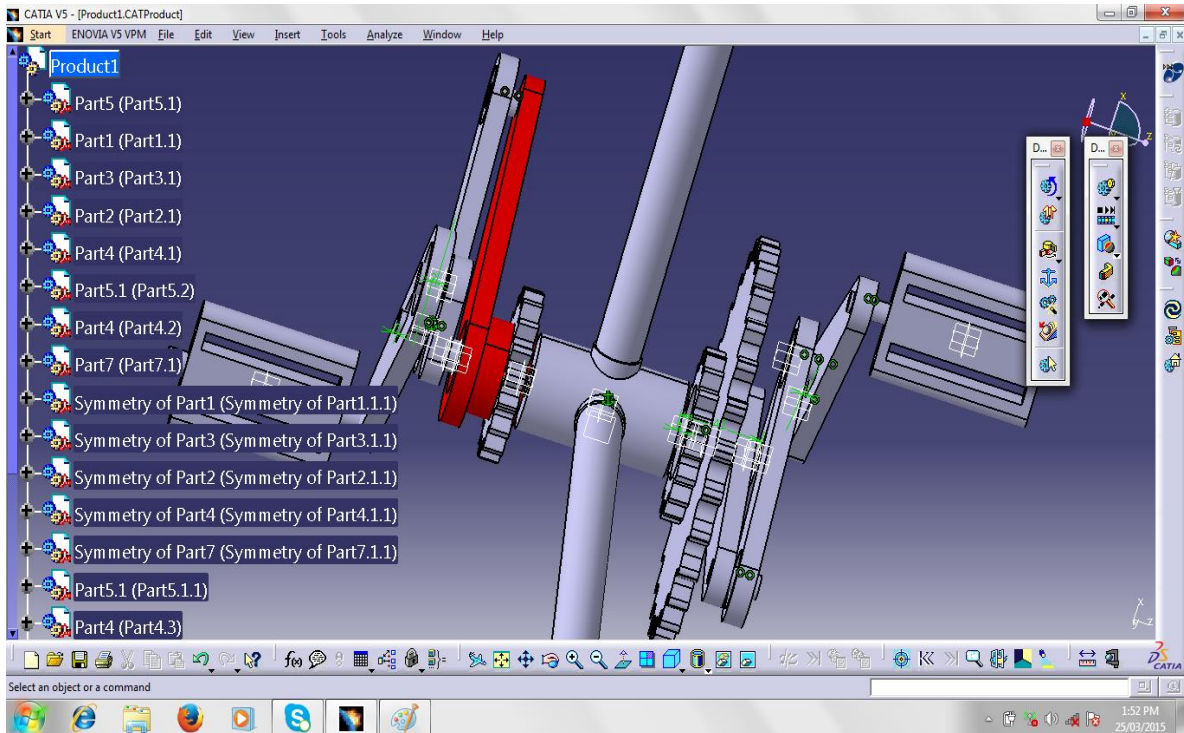


Fig.2. Modeling of bicycle pedal.

From fig:1 Epicyclical gear box consist-Sun gear, Ring gear, Planet gear spur gear connected to output of rear axle. when two movable arm come to close with fix input is given to planet gear transmit output to ring gear, speed goes on increasing and power decreasing in second case when ring gear is fixed input is given to planet gear where output is come from sun gear with increase speed, and decreasing power following table show locking mechanism of epicyclical gear box to obtain variable speed as per requirement during driving when speed goes on increasing torque decreasing and when torque is increasing speed goes decreasing.

Sun Gear	Arm	Ring Gear	Speed	Power
Input	Output	Fixed	Decreased	Increased
output	Input	Fixed	Increased	Decreased
Fixed	Input	Output	Increased	Decreased

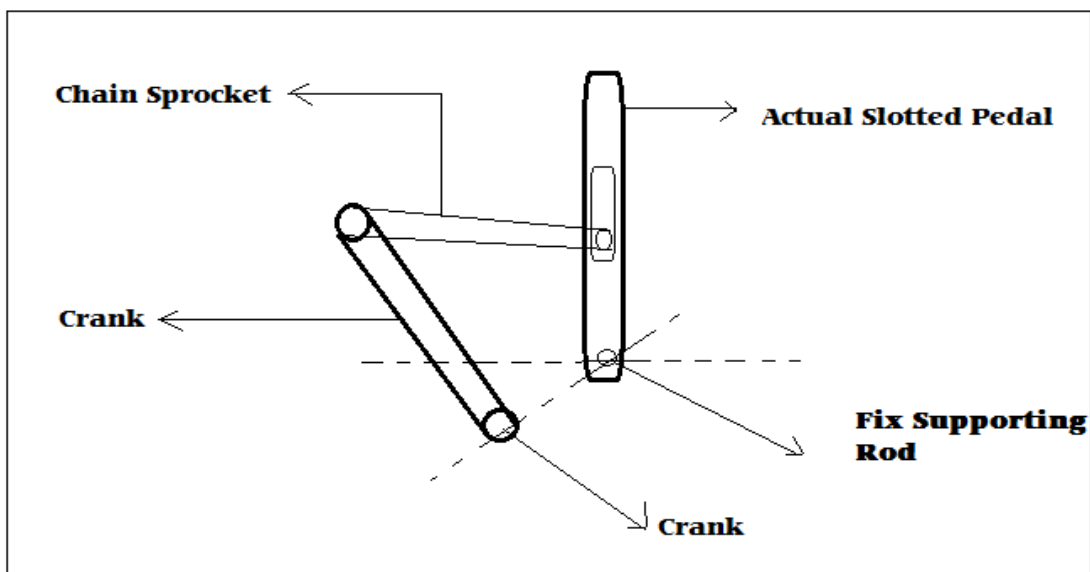


Fig: 3 Schematic diagram of pedal crank rotation.

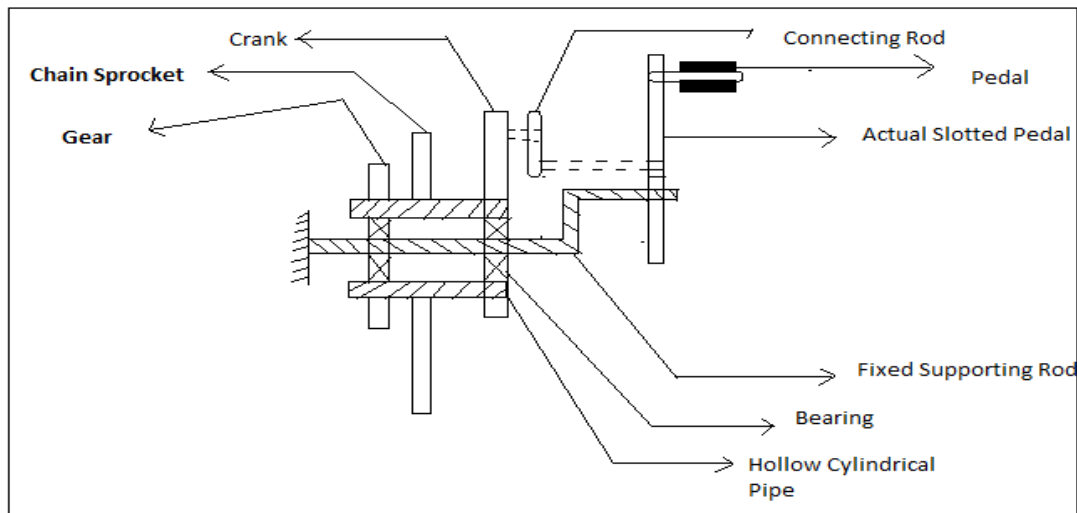


Fig.4. Schematic sketch of prototype pedal

#### IV. Result

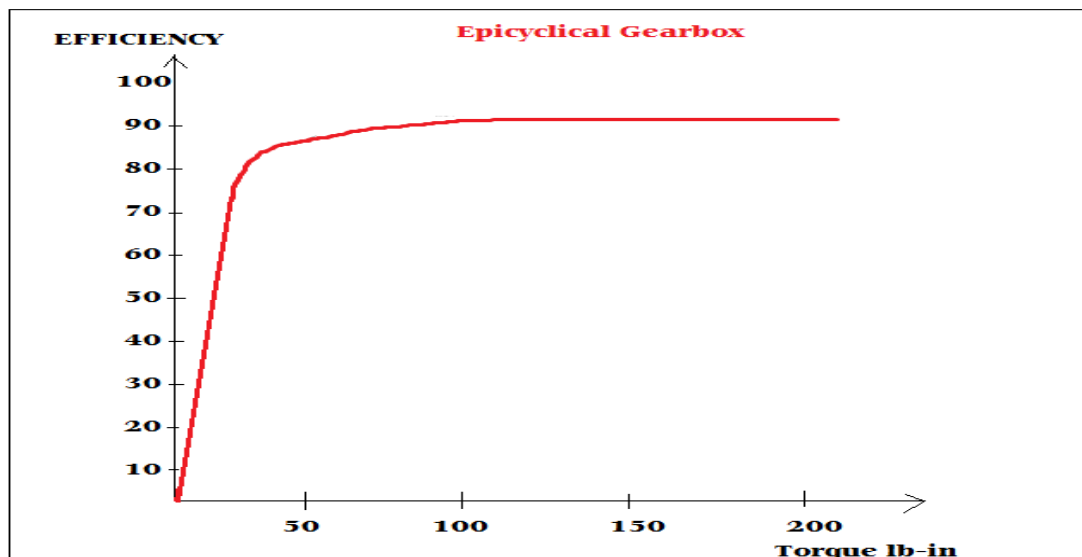


Fig: 5 Efficiency Vs Torque

From the graph, it has been clearly differentiated that the efficiency of planetary gearbox increases initially, then remains constant with increasing torque. As shown in the graph, we conclude that as speed increases torque decreases efficiency is maximum and vice versa..

#### V. Conclusion

In this way, finally we conclude that the speed of a bicycle can be increased by changing the pedal mechanism and implementing an epicyclic gear box to the rear axle for transmitting torque from the sprocket to the rear axle of the vehicle to obtain variable speed of the bicycle as per needed.

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