

EPICYCLIC POWERED BICYCLE

**Prof. S. V. Deshpande¹, Ajinkya V. Waghade², Mayur D. Wadulkar³,
Madhusudan M. Sonwane⁴ Sunilkumar Wagh⁵**

¹*Asst. Professor, Dept of Mechanical engg, GSMCOE Balewadi, Pune. (India)*
^{2,3,4,5}*Student, Dept of Mechanical engg, GSMCOE Balewadi pune, India*

ABSTRACT

Considering the depletion of fossil fuel resulting into pollution it is a need of time to minimize conventional power and boost the utilization of mechanical non-conventional power sources. Currently, fuel powered bicycle are available but they are using conventional source. The research entitled "EPICYCLIC POWERED BICYCLE" includes concept of renewable energy. Power is generated through alternator mounted at periphery of rear wheel. A chainless bicycle using epicyclic gear train is provided for pedalling. In addition to this two small rotary fan are mounted upon the front wheel of bicycle generating power by using wind source. This generated power is supplied to mechanical motor through battery which are mounted on carrier of rear wheel. When the rider is pedalling a bicycle, a motion is transmitted from sprocket of extended shaft of motor to rear wheel through chain drive.

The outcome of this system is to relief the human efforts by transmitting high speed rotation using non conventional powered motor which is also applicable for long drives. It does not affect the environment (GWG) with no fuel consumption & cost of utilization is zero.

Keywords: Mechanical Powered Motor, Non Conventional Power, Speed Ratio.

1.INTRODUCTION

India is the second-largest country of the world, undergoing explosive growth. Like many other countries where agriculture is the main activity, biomass and other non – commercial fuels constitute around 40% of energy requirements in India. Around 85.49% of Indian villages are electrified. People use bicycles as the main medium of transportation in villages. In addition in cities, where most of the people are using bicycle for exercise. In India, many of the villages are still without electricity and most of them use bicycle as their medium of transportation. In such places, our system will be of great help.

We are using most of the systems & technologies that consumes our time. And thus life becomes so easier. Now a days we are using non-Renewable Energy source in a excessive form but after few year later it will exhaustible. So we are neglecting the amount of the energy that is conventional. Therefore day by day It is being more expensive.

Today's we are facing the problems of load shedding In the villages most of the time load shedding does for 12-15 hours of the day. For the reason we get an idea of our Research paper to generate the electricity using the mechanical energy source, as a mechanical assembly.

We want to use bicycles and pedal for generation of power as a means to help solve part of India's electrical problems. The concept is that Indians are sold or given stationary bikes to generate free electricity using a battery attached to the bike. That battery is charged as the rider pedals the bike. Pedaling turns a generator, which in turn produces electricity that can be stored in the battery.

According to energy conversion law, energy neither be created nor be destroyed but can be transformed from one form to another. Humans are able to generate approximately 150W of power while riding bicycle. However, this power goes waste without any use. So we must have to recover this energy for effective utilization of energy. A alternator or an alternator can be used for harvesting the energy generated by a cycle rider while riding.

1.1 Problem Statement

When the word 'bicycle' comes in the mind. We all know, what is this concept is all about. We all are familiar with bicycle. Our half of the age has already gone by using bicycle.

Let us think about those problem which we have faced while using bicycle. Definitely it will make a long list..!

- 1) When we used those bicycle we have faced chain & sprocket friction problems for its maintainance lubricating oil are using for its better performance.
- 2) Continuous pedalling will make more tired and also have lots of human power losses. The human can generate 150Watt power by continuous per hour pedalling.
- 3) When we travelling to mountain and hilly areas with the same bicycle it becomes more difficult for the rider to ride his bicycle.
- 4) While traveling by the bicycle when we stop at the signal or somewhere, then we have to start pedalling bicycle with new energy.

1.2 Solutions

To overcome from above discussed problem, we want to modify our simple or regular based cycle to the next level so it will be helps us to relief human effort.

- 1) We are trying to re-modifying the bicycle in such a way that it will composed of different components such as motor, battery, alternator.
- 2) We are trying to eliminate the total chain & sprocket assembly instead of it we are using epicyclic gear train assembly.
- 3) By using such gear box, it will be exactly double efficient as compare to simple or regular bicycle.
- 4) It will required less human power for its operation.
- 5) It will also help for easy transportation.

It won't require any new power to ride once it is stopped, the energy produced in the battery itself run the cycle just like bicycle

II LITERATURE REVIEW

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We are trying to use most of system & technologies that can consume less time, thus the life become more easier. But we want to neglect the dependence of alternatives fuels & try to use electrical components as more as possible.

For the reason we get an idea from above research paper to generate electricity using non-conventional energy source as a mechanical assembly.

❖ S. Dunnett: Small Wind Energy Systems for Battery Charging.

Practical Action Technical Information Leaflet.

From above research paper we got idea about wind power, small wind energy generation can helps as the additionally. The motor can be mounted near the front wheel.

III OBJECTIVE

The main objective of this project is to reduce the manual efforts. Combing various components to the simple bicycle to create a hybrid bicycle which will help to ride for its better and efficient working.

Eliminating sprocket & chain will helps to reduce the use of lubricating oils. The main aim of this project that we wanted to create a bicycle free from conventional energy like fossil fuels. Which will environmental healthy. So that it won't make any problem in future.

IV CONSIDERATION

When the whole idea is discussed about the concept epicyclic powered bicycle, there were some difficulties which would have to be faced with the members.

Discussed below,

- 1) What kind of battery should be selected.
- 2) Which alternator should be considered for the working.
- 3) How much power of motor should be used for the better convenience of bicycle working.
- 4) What kind of gear is selected, epicyclic gear train consideration.
- 5) Rotary fan (Board fans are selected)

When the consideration was carrying out, 1st of all the motor was the main part which was the most important component which has to be selected,

When we attached the motor to the bicycle following consideration are taken out,

- 1) Average weight of natural human will be considered as 75kg.

- 2) Average weight of the bicycle is considered as 15kg.
- 3) Combining it will be 90kg.

Now, neglecting plane surface let us consider hilly & rough area where the bicycle is to drive. Average human can travel with a speed of 20km/hr & can produce approx. 150 watt of energy.

Selecting the motor could having enough power to run i.e. 24volt, 250watt the remaining component such as alternator. Due to this we select the battery which is used in commonly bikes of 12V. Which was having enough power to run the motor.

V WORKING PRINCIPLE

An Hybrid bicycle works on chainless drive which is based on epicyclic gear train. As usual, first of all the bicycle is driven by the pedal operated chainless drive. The alternator which is mounted near the rear wheel will starts rotating along the wheel. So that the alternator will starts generating energy and that form of energy will be stored in the battery. Thus the mechanical energy is converted into electrical energy. This energy will provide the input power to motor. And the motor will increase the rpm of the wheel. In addition to this two rotary fans on front wheel will also carried out the same process.

FIGURE

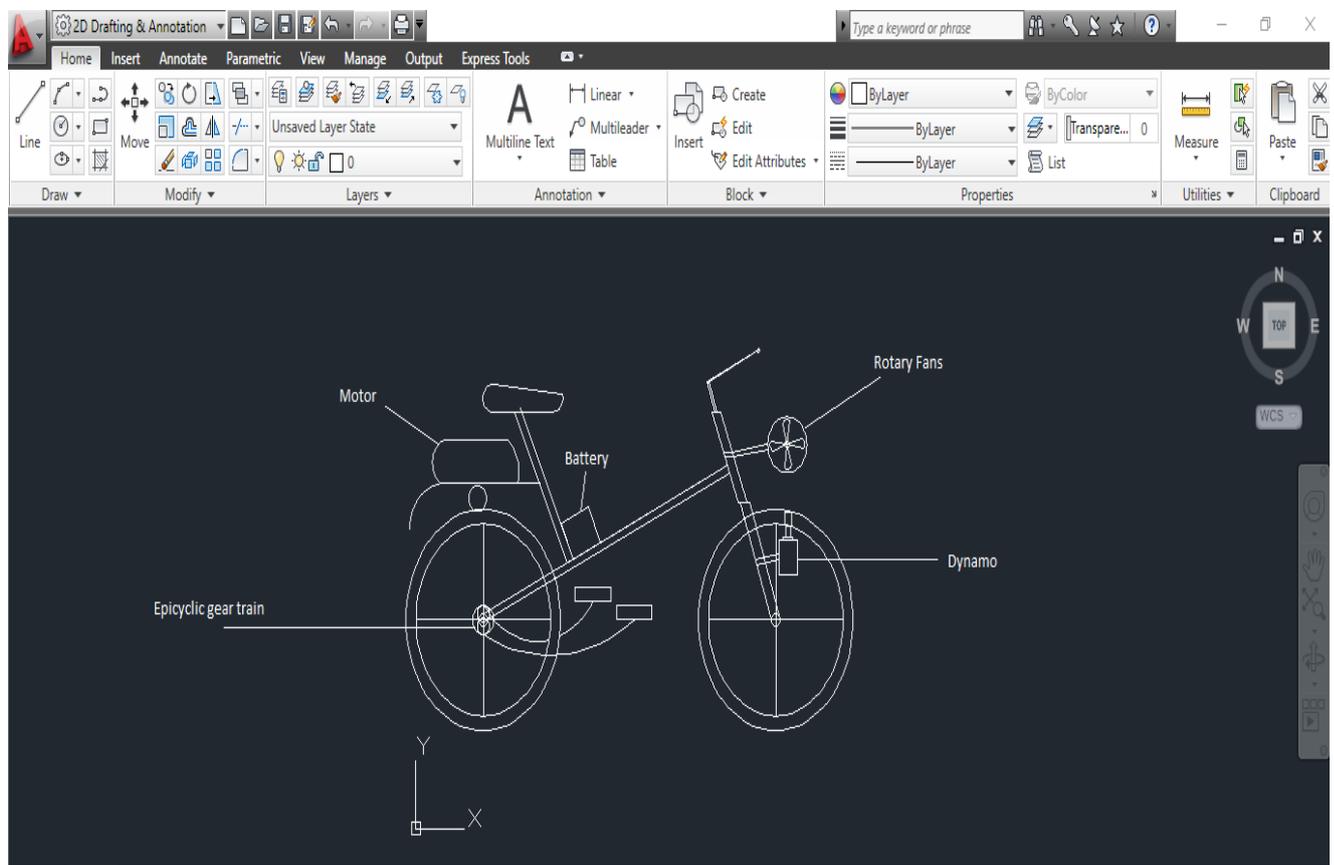


Fig.(a) Epicyclic powered bicycle

VI COMPONENTS OF HYBRID BICYCLE

- Bicycle
- Epicyclic gear box
- Alternator
- Battery
- Motor
- Rotary fan(Windmill)
- Connecting wires

6.1 Bicycle

- As we are familiar with regular bicycle which is composed of chain and sprocket.
- But here we are replacing the chain and sprocket assembly with pedal operated epicyclic gear train.

Following fig. Will show the brief idea about the bicycle.



Fig. Bicycle

6.2 Epicyclic Gear Box

- Firstly we discussed for selection of gears and from overall surveying we came to the conclusion that epicyclic gear train assembly will be the best of all.



Fig. Epicyclic Gear Train

6.3 Alternator

- Alternator is a device which works exactly as same as dynamo.
- Just the difference is when we have to generate more power it is impossible to produce required power from dynamo.
- So instead of it we are using alternator.



Fig. Alternator

6.4 Battery

- In this project here battery will play the main role.
- Because it will store the power which is produced by the alternator.
- Further it will supply the input power to the motor.



Fig. Battery

6.5 Motor

- The motor will run with the help of power provided by the battery.
- As we selected the motor for having maximum torque to bicycle.

Specification

- Electric Bicycle permanent Magnet **DC Motor MY1016**
- **24 volt 250 watt** output electric Bicycle motor.
- rated speed (rpm) : **2650 +/- 5 %**
- rated current : **≤ 13.7A**; current without load : **0.7 - 1.4 A**

- rated torque :**0.87 Nm**
- transmission :chain sprocket (11 teeth, pitch 1/4"=6,35 mm), exchangeable, fixation nut shaft diameter :10 mm (milled groove one-sided 1,5 mm)



Fig. Motor

6.6 Rotary Fans

- The two board fans which are mounted near the front wheel.
- This fans plays a role like as wind energy.
- This will help for additional power generation.



Fig. Rotary fans

VI ADVANTAGES

As compare to chain drive bicycle, this bicycle complete 2 rotations of wheel in single stroke of pedal.

- Pollution free.
- It is cheaper than bikes.
- No fuel consumption hence zero fuel costs.
- Negligible maintenance

VII CONCLUSION

In conclusion human power there is a vast scope in economical use of hybrid bicycle mechanism as an alternative energy source thereby renewable energy generation as well as exercising for good health cause. To

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overcome from such fossil fuel problem this hybrid bicycle will definitely help the user so that it will be beneficial for the user as well as environment without affecting it.

In this mechanism we have combined the independent component and are getting energy consumed while exercising is presented.

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