

Design and Fabrication of Bicycle with Bike Gear Box

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Abstract — Bicycle is a two wheel vehicle which is invented in 1817. This vehicle can be powered by a rider and can be steered using a vehicle. There were various forms of bicycles in the past history has through which the existing forms has evolved. Studies are still going on for making bicycling more comfortable and economical. So in this paper we are going to see the better version of bicycle by Electric vehicle mechanism with bike engine gear box As we saw, from olden days to now the bicycle has evolved according to time. Bicycle requires physical energy, so by doing some modifications the bicycle can run by electric energy. Its an Eco-Friendlier vehicle. In this project we are going to see how we can run the bicycle by Electric energy with gearing mechanism. In this bicycle mechanism, we need battery, motor and gear box. Battery is required to supply energy, Motor is required to run the bicycle by connecting it with chains. Gear box contains gears which is used to alter the speed of vehicles.

Keywords: Bicycle, Bike Gear Box

I. INTRODUCTION

Vehicles that have two wheels and require balancing by the rider date back to the early 19th century. The first means of transport making use of two wheels arranged consecutively, and thus the archetype of the bicycle, was the German draisine dating back to 1817. The term bicycle was coined in France in the 1860s, and the descriptive title "penny farthing", used to describe an "ordinary bicycle", is a 19th-century term. In modern era bicycle has highly evolved. There are various forms of bicycles

II. ELECTRIC VEHICLE

A. EV Introduction

An EV is a shortened acronym for an electric vehicle. EVs are vehicles that are either partially or fully powered on electric power. Electric vehicles have low running costs as they have less moving parts for maintaining and also very environmentally friendly as they use little or no fossil fuels (petrol or diesel). While some EVs used lead acid or nickel metal hydride batteries, the standard for modern battery electric vehicles is now considered to be lithium ion batteries as they have a greater longevity and are excellent at retaining energy, with a self-discharge rate of just 5% per month. Despite this improved efficiency, there are still challenges with these batteries as they can experience thermal runaway, which have, for example, caused fires or explosions in the Tesla model S, although efforts have been made to improve the safety of these batteries. It can cost as little as £7.80 to fully charge an electric car from home and can even be free in public car parks.

B. Advantages of EV

1) Lower running costs

The running cost of an electric vehicle is much lower than an equivalent petrol or diesel vehicle. Electric vehicles use electricity to charge their batteries instead of using fossil fuels like petrol or diesel. Electric vehicles are more efficient, and that combined with the electricity cost means that charging an electric vehicle is cheaper than filling petrol or diesel for your travel requirements. Using renewable energy sources can make the use of electric vehicles more eco-friendly.

2) Low maintenance cost

Electric vehicles have very low maintenance costs because they don't have as many moving parts as an internal combustion vehicle. The servicing requirements for electric vehicles are lesser than the conventional petrol or diesel vehicles. Therefore, the yearly cost of running an electric vehicle is significantly low. 1

C. Materials Required

- Components used
- Bicycle
- Electric motor
- Controller
- Key
- Bike gear box
- Wires(as required)
- Disc breaking
- Battery





III. ELECTRIC VEHICLES: CHALLENGES, SOLUTIONS & FUTURE

Like the two sides of a coin, the electric vehicle industry in India is emerging with two distinct faces. On one hand, there has been an increasing acceptance of electric mini transport vehicles and buses while on the other there has been a spate of news regarding electric two-wheelers igniting into flames. The point to note, however, is that India is steadfastly moving towards adoption of EVs as India's ambition towards an electric mobility economy by 2030 was announced in 2016. Further, in a recent communication by the Ministry of Road Transport and Highways and NITI Aayog, the government announced its aim of increasing the share of EVs from its current share of less than 1% to nearly 30% by 2030.

This implies that by 2030, the total estimated number of electric two-wheelers on Indian roads will be more than 200 million, while for cars and buses, the electric vehicles have been estimated at 34 million and 2.5 million. To focus on the manufacturing of EVs, the shift from internal combustion engine (ICE) to batteries and electric motors is tough. But there is no denying that it's a challenge that manufacturers and suppliers are tackling head on. Faced with new regulations to help reduce global carbon emissions, original equipment manufacturers (OEMs) have had no choice but to shift focus away from diesel and gasoline to batteries. Almost every OEM has now gone public about their plans for electric vehicles.

IV. NEED FOR MOTORS:

Whether it's an electric car, truck or tractor, traction motors are vital for making wheels spin. That's why many automakers such as BMW, Ford, General Motors and Volkswagen plan to assemble motors in-house. For instance, Ford is spending \$150 million to refurbish its Van Dyke transmission plant in Sterling Heights, USA, to mass-produce e-motors. General Motors is also taking a vertically integrated approach with its modular Ultium Drive power train family, which consists of three interchangeable motors. "As with other propulsion systems that are complex, capital-intensive and contain a great deal of intellectual property, we are always better off making them ourselves," Adam Kwiatkowski, Executive Chief Engineer for Global Electrical Propulsion, General Motors said in an interview for a publication.

V. CONCLUSION:

This paper explains that designation of bicycle with bike gear box that runs electric battery as input energy instead of using fuels like petrol or diesel. This cycle contains bike engine with bear box consists of 4 gears to control as our desirable speed. The electric battery we used is 24volts i.e (12volt +12 volt battery).Two breaks front and back brake is fixed properly. The engine gear parts are welded properly as required for our modification. The controller is mounted on the front side before the seat all parts are connected to the controller it supply the current from the battery to every other parts. The gear contains two sockets that connect with the motor and back wheel that makes rotation makes our electric bicycle move. The battery is mounted on the backside of the bicycle and tied properly. In our project giving 12+12 volt battery instead of 24volt battery(they both contains same amount of input exactly).we are getting 24V battery input by interconnecting the positive terminal of one battery to negative terminal of another battery. The input can be checked by multimeter. The battery we used here was lead acid battery; it is chargeable so we can use this battery and cycle for long term. But there are some drawbacks too, like the maximum speed limit of this bicycle is 40km/hr and the perfect placement of parts is required otherwise it is unable to balance. The number of persons travelling capacity is only one because the carrier is occupied by electric battery changing the position of them may lead to misbalance and failure of the project. But there also many benefits and advantages of this cycle as we see them as follow. By using this type of bicycle we can reduce air pollution and noise pollution, because there is no usage of fuels like petrol or diesel so there will be no pollution, Eco-Friendly vehicle. It is also low costs comparing to EV and vehicles that runs by fuels. By using better and battery we can increase the speed of the cycle. It is also affordable .So the Affordable, Eco-Friendly, pollution free and easily manageable E-Bicycle is designed and fabricated successfully.

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