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Research Paper

Design and Fabrication OF Flywheel Bicycle with Mobile Charger

Engineering

KEYWORDS : Relative Motion, Flywheel, Frame

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ABSTRACT

At the beginning of the preliminary step of the project, we came to know about the important application of the flywheel and dynamo. In actual bicycle the kinetic energy obtained from the pedaling power is utilized and is not recovered. By designing and fabricating the flywheel bicycle with mobile charger fetches you the recovery of the kinetic energy produced from the pedaling power and also with addition of mobile charger by the use of the headlight generator (dynamo).

1. INTRODUCTION

A flywheel is an energy storage device that uses its significant moment of inertia to store energy by rotating.Flywheels have long been used to generate or maintain power and are most identified with the industrial age and the steam engine.In one sense it can be thought of as a rechargeable battery that store energy in the form of mechanical energy instead of electrochemical.

Flywheels have been gaining popularity as a possible replacement for chemical batteries in vehicles, but until last year there was no record of a flywheels being used to increase the efficiency of a bicycle.

In 2011, Maxwell von Stein, a student at Cooper Union, added a flywheel and a continuously variable transmission to his bike for his senior project. He used a car flywheel he found that weighs 15 pounds. His idea won him the Nicholas Stefano Prize, which is Cooper Union's award for superior mechanical engineering design. He also gained quite a bit of notoriety on various biking websites and was featured in NPR's weekly segment, "Science Friday."

2. CLASSIFICATION OF COMPONENTS USED[1]:

FlangeThe flange is where the bearing and the end piece will be housed. The flange is necessary because it will prevent the line that the end piece holds from being twisted. The bearing will take the rotational load so that the clutch (the line) can be successfully actuated.

FlangecoverThe flange cover will hold the bearing and the end piece in place. It has a small extruding piece that will be the part that actually pushes the 90 tooth gear. The hole going through the center is 100mm in radius, so it is smaller than the end piece. This will allow the line to go through while still holding the end piece in place. The outer radius of the end cap is the same as the flange and has four matching hole to connect the parts.

Bearing The bearing will rest inside the flange and will be covered in oil. The purpose of the bearing is to take the torque load from the flange and not transmit it to the end piece to allow for a successful clutch actuation. The type of bearing used will be number 6006, which has an outer diameter of 55mm, an inner diameter of 30mm, and a width of 13mm.

Tooth gear sprocketit is fixed to the back wheel rim of the bicycle.Tooth sprocketthe sprocket will connect the flywheel system to the rest of the bike. A chain will connect it to the crank.

Flywheel (wheel rim)The flywheel is where the energy is stored from the brake regeneration. A 20 inch diameter bike wheel rim will be used as the flywheel since it will be smaller than the 26 inchwheels on the bike, is an off the shelf part that is easy to get, has most of its mass on the outer edge, would be easy to add weight to ifnecessary, and has a hub that will be easy to attach to the axle.

3. Material Selection and Fabrication[4]:

S.NO	COMPONENTS	MATERIAL
1	FLY WHEEL	FIBER AND STEEL
2	CHAIN SPROCKET	MILD STEEL
3	RIM	MILD STEEL
4	TOOTH SPROCKET	HIGH SPEED STEEL
5	BEARING	MILD STEEL

Table 1. Materials

6. CONSTRUCTION AND WORKING

While pedaling the bicycle, the flywheel also rotates by the mode of chain arrangement which in turn slightly increases the speed of the bicycle.This setup is more applicable while riding bicycle on the highways. By the rotation of the wheel, the driving wheel of the dynamo also rotates which in turn produces 5V of AC which is converted to DC. Hence the back wheel rotates while pedaling the bicycle and the kinetic energy produced is recovered as the extra movement of the back wheel of the bicycle by the rotation of the flywheel.

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7. Cost estimation and diagrams

S.NO	COMPONENT	COST (IN RS)
1	CYCLE BODY	1600
2	SPROCKET	500
3	CHAIN	150
4	FRAME SETUP	500
6	LABOUR CHARGES	1000
7	OTHER EXPENSIVES	500
8	TOTAL	4250

Table 2. Cost estimation

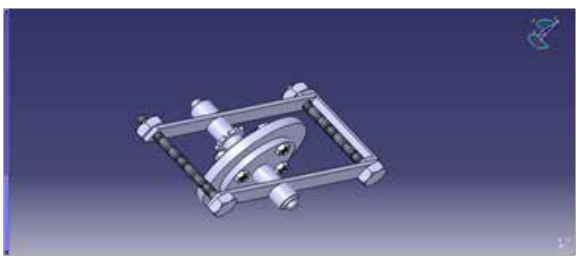

Figure 1 DESIGN OF FLY WHEEL

Figure 2 REAL VIEW OF OUR PROJECT

8. Conclusion:

Thus the flywheel bicycle with mobile chargercycle is designed tested successfully. The output is verified by running the vehicle & charging the mobile, charging by pedaling action. The following advantages were seen such as It is more convenient and easier. It is more eco-friendly. Power is required less to use.

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