CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36178

Project Title

Conversion of Pedal Power to Electricity

Abstract

Objectives/Goals

The objective of this project was to engineer a mechanical invention that successfully converted human power into electricity. Through the means of a pedal generator, the goal was to build a device economically feasible as well as user compatible. The project's wider aim was to develop a mechanism that would generate a clean source of alternative energy, a vital need to our society today.

Methods/Materials

The project consisted of two parts: the mechanical design of the stationary bicycle and the construction of the pedal generator. Materials were kept easily attainable at any hardware or electronics store. After the bicycle was made stationary by elevating the rear tire, the pedal generator was wired to a platform behind it. The bicycle tire was intended to cause rotation of the motor shaft, operationally converting the motor into an electric generator. Initially, a skateboard wheel was used to transfer rotational motion from the bicycle to the motor shaft, by force of friction. However, mechanical issues resulted in the modification of that design. Instead, a more efficient transfer of energy proved to be from directly touching the bicycle tire to the motor coupler. Current from the generator flowed through a diode to the battery. An LED was attached to confirm the generator's electrical output.

Results

The rate of charging was calculated by measuring the increase in battery voltage over cycling time. After testing various cycling speeds, the rate of 60 pedal rotations per minute was chosen to charge the battery in ten minute intervals. The rate of charging was found to be 0.65 volts per hour, equating to the battery's charging time of 4.6 hours.

Conclusions/Discussion

The electrical output for the battery turned out to be extremely small, about 0.022 kWh. For example, it would be required to pedal for 15 hours in order to power a mobile phone for one week. While I was initially disappointed by these results, my project was still a start in using mechanical inventions to generate alternative energy.

Summary Statement

I built a generated that took mechanical energy from a bike and converted it to electricity.

Help Received

I used online resources to search for generator designs.

Preliminary