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MOBILE PHONE CHARGER FOR BICYCLES

Alfonso Jorge Quevedo Martínez

Universidad Autónoma Metropolitana,
Azcapotzalco
Department of Administration, Area of
Mathematics and Systems
Ciudad de México

Martín Hernández Hernández

Universidad Autónoma Metropolitana,
Azcapotzalco
Department of Administration, Area of
Mathematics and Systems
Ciudad de México

Esiquio Martin Gutiérrez Armenta

Universidad Autónoma Metropolitana,
Azcapotzalco. Department of systems
Ciudad de México

Marco Antonio Gutiérrez Villegas

Universidad Autónoma Metropolitana,
Azcapotzalco. Department of systems
Ciudad de México

Israel Isaac Gutiérrez Villegas

INSTITUTO POLITÉCNICO NACIONAL
Ciudad de México

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Abstract: The work aims to create a prototype for generating electrical energy using a dynamo coupled to a bicycle, and a circuit that rectifies the current, in order to charge mobile equipment that requires a voltage of five volts. It is worth mentioning that in the last century a problem with climate change began to be observed, but until today hardly any attention has been paid to this problem that affects the population and future generations, hence the need to make changes that contribute To mitigate this problem, as residents of Mexico City we must have an awareness of these problems since we hardly see what is happening outside of our city, where the most notable changes in this are seen.

Mexico City has a Mobility Law that contemplates sustainable mobility, which considers pedestrians, cyclists and public transport users. Of these previously mentioned means of mobility, it is worth highlighting the use of the bicycle, since it is an alternative for transportation that will reduce the load of vehicles on the roads. The intention is that the Higher Education institutions collaborate in the improvement of the environment, the `` Universidad Autónoma Metropolitana `` has a social program called "I'll lend you a bike." It supports students to carry out the home-university-home path by lending them a bicycle during the quarter. This is an ecological practice, it promotes the reduction of carbon dioxide CO₂, it is easy to use, and it improves physical and emotional health.

The work focuses on generating electrical energy using a dynamo. That converts mechanical energy into alternating electrical energy and, through an electronic device, converts it into direct current of 5 volts, for example, to charge devices with a USB port (information storage unit) such as iPod (portable multimedia player), powerbank (external battery). laptop), GPS (global positioning system), and cell phones.

Keywords: Climate change, carbon dioxide, bicycle, electricity, transportation, dynamo.

INTRODUCTION

An electrical generator known as a Dynamo (commercially its output voltage is twelve volts and six watts) that produces energy through electromagnetic induction in a coil, is a source of alternating current, which undergoes polarity changes in each cycle of time. It is obtained through the rolling of the wheel, which is mechanical energy.

Through the process of transforming a bidirectional current into a unidirectional current known as rectification using the rectifier, the change from alternating current to direct current can be made. However, after this rectification process there is a filtration stage in a series of capacitors, which can make the electrical potential increasingly constant and clean.

Unlike an alternating current, in a direct current, electric charges flow in the same direction constantly, moving from negative pole to positive pole along the path of a circuit. The latter is the current necessary to generate a voltage of five volts, which is suitable for charging a mobile electronic device such as cell phones and tablets.

METHODOLOGY OR DEVELOPMENT

An ecological charger that obtains electrical energy from a bicycle dynamo will be designed and built. To charge a cell phone using a dynamo connected to an electronic circuit, Optimize the design of the circuit, turning it into a product that is easy to manipulate for any user. Reduce costs of this.

Considering that the product to be sold focuses on people who use cell phones and bicycles, the main delimitation is the rural areas that most of the time do not have, in the Mexican Republic in this case, both human

and technological resources for investment. of our project.

Therefore, the main focus would be on growing urban areas and main cities of each state, since these have a drastic increase in inhabitants, forcing the change from transportation such as cars or trucks to bicycles; It is also observed that the urban areas mentioned are those with the highest concentration of cell phones.

COST-BENEFIT

Among the factors to consider for the production of this cell phone charger is that the materials are more expensive at retail than buying them wholesale. For this reason the price will vary.

Table (1) shows the prices of each of the components.

Materials	Price
Dynamo AXA Aluminum Right Dynamo	\$192
Voltage regulator 7805	\$16.98
Alert dissipator	\$25.00
1000 micros capacitor 25 V	\$7
Capacitor 0.1 micros	\$2
USB port	\$12
Bridge rectifier	\$17.72
Perforated welding plate	\$19
Thermofitk 1/16	\$7.00
Led	\$4.90
Labour	\$172.87 (minimum salary)
Total	\$334.18

Table 1. materials used and price per unit

The competition's prices range from 501 to 656 pesos, which indicates that the cost of the product was reduced between 31% and 46%.

In addition, another cost-benefit factor to highlight is that there is no long-term monetary expense at home, because you are not using the phone's power charger, which

uses a certain amount of electrical current.

Likewise, this device can be used to charge your cell phone using exercise machines in a gym.

Figure (1) shows the Dynamo that performs friction with the tire between these two converting mechanical energy into direct current.



Figure. 1 shows the placement of the Dynamo on the AXA Aluminum Right Dynamo brand rear rim

CIRCUIT DESIGN

The voltage required by a cell phone is direct current, as the dynamo provides alternating current, it is necessary to convert the direct current. For this, a rectification stage is used where we perform the voltage conversion that we require.

For the rectification stage, a bridge rectifier was used that can handle up to 100 volts amplitude with currents up to one ampere. See Figure (2)

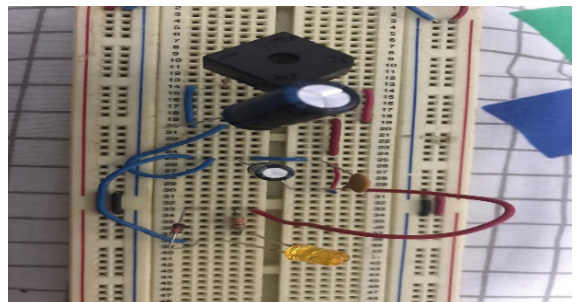


Figure. 2 shows the electronic components on a breadboard

In the Filtering stage, large value electrolytic capacitors were used to reduce the ripple of the rectified signal, these store charge when the voltage is rising and deliver it when the voltage falls. In the circuit design, a capacitor with a working voltage of 35 V was placed in parallel with the positive and negative terminals of the bridge.

For the voltage regulation stage, the voltage

regulator circuit was used, which is a three-terminal regulator circuit that delivers 5 volts at its output and can supply an output current of up to 1.5 Amperes.

Finally, the loaded circuit was tested on different cell phones. Figure (3) shows the assembly and its respective electronic components.

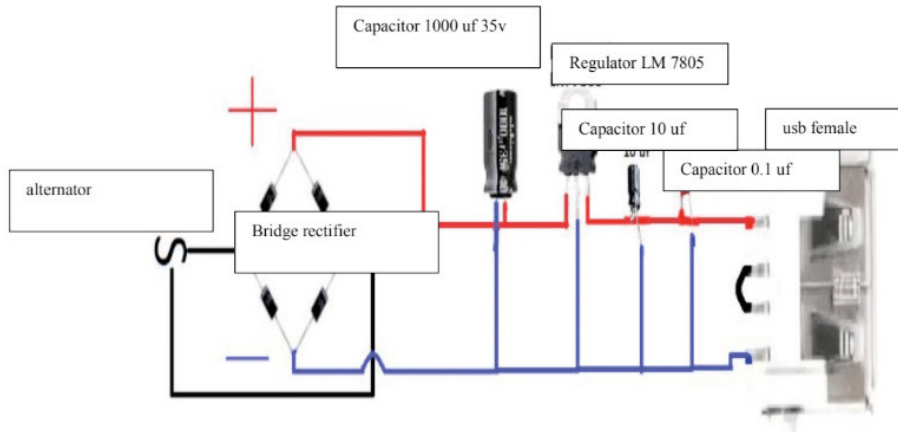


Figure. 3. General diagram of the charger circuit

RESULTS AND ANALYSIS

A charger was obtained at a low cost, compared to commercial ones, so it could be reproduced in series for sale. bicycles in urban areas to reduce traffic that causes emissions of polluting gases that affect any living being. Another benefit is the reduction in energy used when charging a phone conventionally. Also considering the habit of exercising to have good health, it is well known that Mexico is one of the countries with the highest obesity rate due to poor eating habits.

CONCLUSIONS

The ecological cell phone charger allows you to charge your Motorola Z2 Play and Alcatel One cell phones, which are slow to charge. An attempt is made to increase the use of the Motorola Z2 Play charges 1% in 8.15 minutes, while the Alcatel One charges 1% in 5.8 minutes. Taking into account that

currently the screens of high-resolution telephones have a greater demand for energy in the cell phone battery.



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