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INDUCTIVE MECHCHARGER: MECHANICAL PHONE CHARGING DOCK USING FARADAY'S LAW

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9.1 INTRODUCTION

Energy and the environment are the key issues of the world in recent decades Requests for the quest for alternative energy sources has become a response to rising energy sources science and technology one of the top priorities. Over 90% of the global population power produced is based on electromagnetic induction laws from faraday. Thus, Free Energy / Electricity interests are becoming popular. The definition of free energy is a misconception. Nothing like free energy is there. But if we use tools like Solar, Wind, Tidal, and Hydro-Electric to produce it, Geothermal is free of charge only after the initial cost of capital. After the fact, the produced energy is free, that the electricity created by these unorthodox methods of electrical power generation must not be compensated for.

Therefore, for some time, the idea of electricity generation with magnets has been around. They are used to generate energy through their magnetic fields. These magnets are mounted in engine and generator cores. The basic theory of power generation lies in the magnetic effect. "When the vehicle rotates in a magnet field, a voltage is generated in the car." [1,2]

We are now also seriously considering to further develop compressed natural gas, geothermal, micro-hydro, wind and photovoltaic as energy resources. On the other hand, energy products and materials such as coco-methyl esters and other biofuels, biomass, and alternative

fuel feedstock like Jatropha will continuously be studied and improved. The development of these resources zero in on the country's continuing pursuit for energy independence and efficiency. This is also in keeping with our aim to make our indigenous sources have a considerable impact in the country's energy mix [3].

This article made the researcher come up with the idea of Electromagnetic Induction means. In this experiment, we named it as INDUCTIVE MECHCHARGER, because this is an experiment using Faraday's law of induction and mechanical energy because we are rotating manually with our own hand, therefore, we come up with that name. It can be explained in general terms that, this is a simple experiment with the DC motor as our main material, we are using a DC motor to become a generator because it can help us to convert mechanical energy to produce electricity.

9.2 BACKGROUND STUDY

Learning is not enough if we only learn theories, without experience we will be more struggling to understand the topics given in the lecture. The best way to understand the topic of learning is practicing or doing some simple experiment (hands-on activities) related to the topic being studied in order to make it easier for us to understand more.

According to research by Catherine Gardner (1990), hands-on activities appeared to increase scores from pre-test to post-test and also apparently lead to increased understanding and more positive attitudes [4]. Therefore, we conduct an experiment about a mechanical phone charging dock using a concept of Faraday's law induction in order to facilitate us in understanding the concepts and the topics contained in Faraday's law [5].

9.3 METHODOLOGY

Since this study does not involve a complex experiment, the results will be direct thus no complex analysis is needed. No data is collected during this study.

The experimental setup consists of a few materials as listed in Table 9.1. In preparing the model all the materials gathered are performed with a simple procedure in order to make the charger model.

Table 9.1: Material for Experiment Set-up

Materials	
1.	DC motor
2.	USB Cable
3.	Circular Polystyrene
4.	Wire Cutter
5.	Wooden Block
6.	Pensils
7.	Polystyrene Base
8.	Rubber Band

The procedure for making the charger is very simple. First, the USB cable is cut in the middle using a wire cutter and the end can be connected to the phone. Next, the outer layer is removed. Green and white inner wires are removed since they are not being used. Black and red inner wires of the USB cable are twisted together with black and red wires of the DC motor respectively. Holes are applied to the wooden block and circular polystyrene so that a pencil can be inserted. Another center hole is applied to the polystyrene so that it can fit a pencil. A hot glue gun is applied to the ends of the pencils so that the pencil does not slip away when being rotated. The wooden block is forced into the polystyrene base and a hot glue gun is applied surrounding the lower part of the wooden block to make it stand strongly. The rubber band is fitted onto the polystyrene and the DC motor. After making sure the pencil can be rotated comfortably, the DC motor is stuck right below the circular polystyrene using a hot glue gun. The USB is connected to the phone. Figure 9.1 shows the full set-up of the design charger for the experiment.

Figure 9.1: Shows the full experiment set-up

9.4 RESULTS AND ANALYSIS

At the point when the motor shaft is rotated, the armature wire loops cut the magnetic field produced by the stator permanent magnets, making a voltage to be induced across the wire loop terminals. This voltage is gathered by the commutator segments and delivered to stationary brushes connected to the motor terminals.

During the first attempt of the experiment, it was observed that the battery charging was not consistent and only displayed a charging sign once despite the consistency of the rotation. However, after increasing the speed of rotation, the phone displayed a more frequent charging sign. The issue with a motor is getting a consistent pace of rotation and keeping it. The rotation also has to be very fast to accomplish usable power levels. Table 9.2 shows the variables that are recorded during the experiment. Figure 9.2 shows the relation between generated voltage and speed rotation of the dc motor. It shows that when the generated voltage increases the speed rotation also increase. This data shows that it was directly proportional when plotted into a graph [6,7].

Table 9.2: Rotation speed vs Charging consistency

Rotation Speed	Charging consistency
Slow	Inconsistent
Fast	Slightly inconsistent

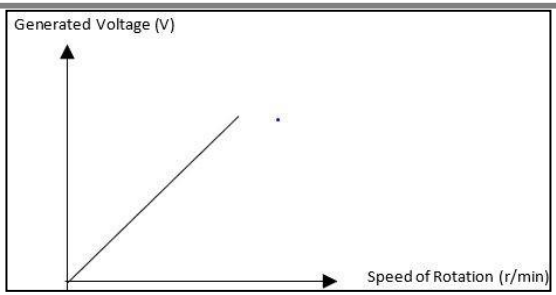

Figure 9.2: Graph is directly proportional when generated voltage (V) vs speed of rotation (r/min)

9.5 CONCLUSION

Faraday's law is the main principle used in the motor, generator, transformer and many electrical machines. This electromagnetic induction is used to supply power to many electrical devices. One of the biggest uses is in hydroelectric dams where electrical energy is generated to be supplied to certain areas. Other daily appliances using this law include washing machines and electric hobs and cookers. In this experiment conducted, we were able to observe and apply the theory of the law and Fleming's right-hand rule depending on the direction of rotation of the pencil. While rotating the pencil, we could also relate the speed of rotation with the generated voltage in which increasing the speed with consistency will generate more voltage, thus more charging rate. Although the setting of this experiment is most likely not being used to increase the battery level of the smartphone, technology developers have found a way of using this principle to effectively charge smartphones using this law in the inductive charging mechanism or widely known as 'Wireless Charging' in which latest smartphones use now.

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