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Piezo Electric Based Shoe Charger

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Abstract: - Saving and utilizing the energy expeditiously is one in all the largest concern today, however generating the full new energy whereas operating isn't during this technology-driven world. Walking, running, taking part in will generate electricity and may be carried together with the person for utilization whenever and wherever ever required. Once someone walks, the pressure is exerted on the bottom and this pressure may be born-again into current and may be wont to power the electronic devices. The goal of the project is to see if it's doable to charge a private device exploitation wasted energy harvested from walking or cardiopulmonary exercise wherever the final word goal of getting the repeatable results of charging the device by walking.

Key Words: — ***Renewable energy, electricity, transportable charger, electricity Charger.***

I. INTRODUCTION

Now a day's energy is one in all the foremost necessary problems round the world. Renewable energy sources may be an excellent medium to unravel this energy crisis drawback. As we, all know natural resources can end in the future; researchers try to introduce substitute energy sources from nature. That has to be inexperienced and not harmful to the setting. Natural processes with continuous renewal obtain renewable energy. There is wasted energy all over. An enormous variety of individuals walking, jogging, and running each day generate huge energy that is simply a loss. The compression and bending of the shoe sole represent some way for gather energy that would be place to helpful applications. Composition electricity plates within the sole of a shoe, there is an opening to regain an even quantity of energy. There are some existing devices in recent times that harvest the K.E. created by personalities for the assembly of helpful energy from the small l power provide because the wants are increasing greatly with time as our technology is moving towards the micro and nanofabrication levels.

II. METHODOLOGY

A. Basic Principle of Piezoelectric Sensor

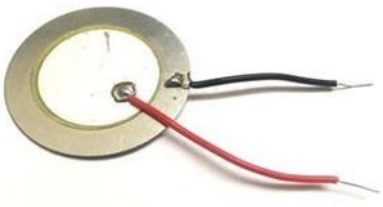

Fig.1. Electricity Device

Piezoelectricity is current created from mechanical pressure with the assistance of electricity sensors. Electricity materials have two properties that are outlined as a right away and converse result. The direct result is that the property of some materials to develop charge on their surface once mechanical stress is exerted on them, whereas the converse result is that the property of some materials to develop mechanical stress once an electrical charge is evoked. Within the Converse result, once the pressure is applied to associate degree object, a charge is created on the dilated facet and a charge on the compressed facet of the crystal. Once the pressure is mitigated, electrical current flows across the fabric.

A. Diodes

Fig.2. Diode

Diode could be a semiconductor that acts as a unidirectional switch for current. It permits current to flow simply in one direction, however severely restricts current from flowing within the other way. During this project, we tend to are mistreatment diodes for creating bridge rectifier circuit to convert AC power supply to DC power supply as shown below.

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B. Conversion of Ac Power Supply to Dc Power Supply

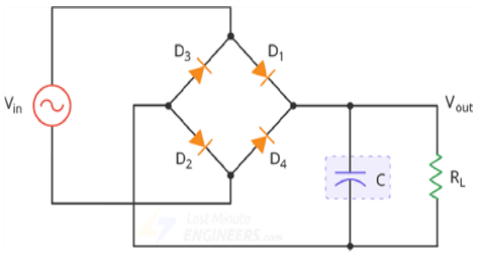

Fig.3: Circuit Diagram of Bridge Rectifier

In each project of physics, the ability provide is that the backbone. The most power supply that produces this project attainable is termed an electricity transducer/piezoelectric part. They are comprised of parts like crystals and ceramics that have the special ability to convert physical energy into AC electricity. However, there is a small drawback, Alternate Current (AC). We'd like electrical energy (DC) for our project. Full-bridge rectifier is usually used as rectifier circuits to convert the AC output of an electricity into a DC voltage. The rectifying circuits carries with it four diodes. The voltage has to rectify thanks to the necessity for a relentless provide of voltage. Hence, this drawback is going to be resolved by making a Bridge Rectifier with diodes in order that AC power may be reborn into DC power.

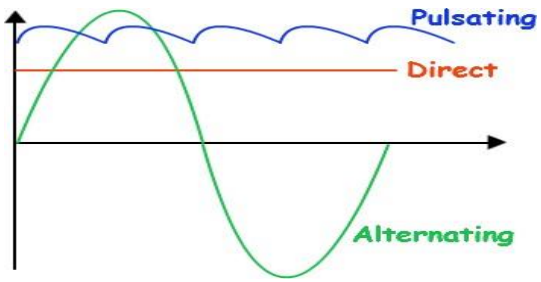

Fig.4. Waveform of AC to DC power

C. Lithium Polymer Battery

Fig.5. Lithium polymer Battery

As LiPo, LIP, Li-poly, lithium-poly et al., could be a reversible battery of lithium-ion technology employing a compound solution rather than a liquid solution. High physical phenomenon solid (gel) polymers type this solution. These batteries offer higher specific energy than alternative atomic number 3 battery sorts and are utilized in applications wherever weight could be an important feature, like mobile devices and heavier-than-air craft.

D. Voltage Regulator (7805)

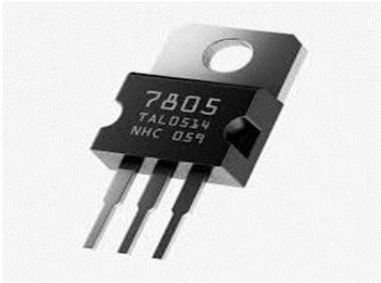

Fig.6. 7805 Regulating integrated circuit

7805 could be a transformer microcircuit. It's a member of 78xx series of fastened linear transformer ICs. The voltage supply in an exceedingly circuit could have fluctuations and would not offer the fastened voltage output. The transformer IC maintains the output voltage at a continuing worth. The xx in 78xx indicates the fastened output voltage it designed to supply. 7805 provides +5V regulated power provide. Capacitors of appropriate values are often connected at input and output pins relying upon the individual voltage levels.

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E. USB Port

Fig.7. USB Port

A USB port could be a customary cable affiliation interface for private computers and client natural philosophy devices. USB stands for Universal Serial Bus, associate degree business customary for short-distance digital information communications. USB ports enable USB devices to be connected to every different with and transfer digital information over USB cables. During this project, we have a tendency to be exploitation USB port to attach cable to charge mobile.

III. Design And Development

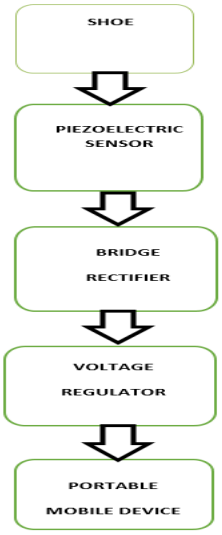

Fig.10. Block Diagram of Proposed Work

As shown in figure the basic block diagram of piezo electric shoe charger. Whole circuit is built under the shoe where piezoelectric sensors act as the main part of the project. Here connections have been done with respect of two pairs of piezo-electric sensor. In each pair of piezo electric, 3 sensors are connected in series. Two pairs of piezoelectric sensors are connected in parallel with each other in respect to increase the output voltage to rise provide 9V. The output connection from the piezoelectric circuit is fed to the bridge rectifier circuit. Bridge Rectifier converts AC current source to the DC current source. This DC current source is given to the voltage regulator, as we know voltage regulator is used to control current in constant voltage to charge the battery, we need minimum 2.5 to 5 voltage current which is control by voltage regulator. After battery the battery gets charged, we can charge our mobile through the USB port, which is given in the circuit where we connect the cable to charge the mobile.

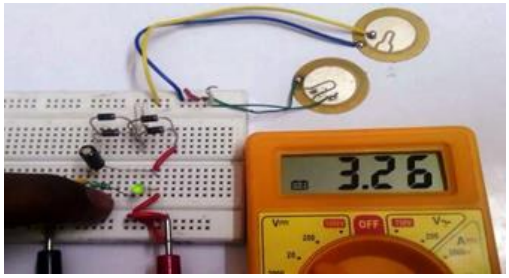

Fig.11. Testing Output Voltage

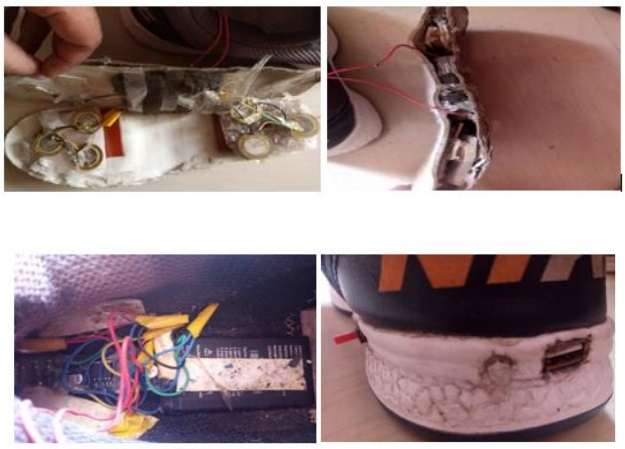

Fig.11. Assembly of circuit

IV. Results And Conclusion

Hence, we can generate the completely new energy from the energy being wasted in our daily life and can use it wisely all day long. This energy does not lead to the wastage of energy and the capital needed. This can harness the power generated by the human movements and transfer the power to a device. This energy can be stored and then utilize for other applications of power supply.

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