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Generation of Electricity from Noise Pollution

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ABSTRACT: Noise Pollution, i.e. the least of all types of pollution is ignored by most people which can be recycled and turn into electricity sources. Noise is an effective source of electricity just like sunlight. Noise (sound) energy can be converted into viable source of electric power. There are multiple sources of sound which go unnoticed, one of them is the noise generated by industries. The conversion of sound waves (noise pollution) into energy proves that noise can act as an alternative source of energy. This research aimed to design and develop a device that has the ability to convert noise into electricity and store it for emergency use. The specific objectives were as follows: To determine the components needed to develop the noise pollution based power bank in terms of Hardware and Software; to describe the noise pollution based power bank circuitry and design architecture; to determine the noise or decibels to be harvested to create power; process the noise into power as source of electricity; and to determine how much electricity do the noise pollution based power bank will generate voltage, current, and resistance; to determine the efficiency of the Noise Pollution Based Power Bank when tested using different mobile gadgets.

I. INTRODUCTION

The need for an alternative source of energy is rising fast. Until now, majority of power needs of the world relies upon the exploitation of the non-renewable fossil fuels. However recent estimates put the use of oil and coal up to 2030, after which the world will need to foster the need for a more efficient and wide spread use of technology. The search for a renewable source of energy that can satisfy our ever growing needs is the need of the hour. Solar & wind energy have already been tapped as a source of renewable source of energy, and are now being widely accepted as one of the replacements for fossil fuels. However their availability and adherence to natural factors such as weather conditions.

However a largely ignored and more readily available source of energy is available in the form of sound energy. Sound as an alternative source of energy has a huge potential that has been left largely untapped as we progress further towards using Renewable and sustainable sources of energy.

This paper takes a step forward in this direction, using sound as source of energy to provide a viable electronic source in a vehicle, converting the sound waves into electrical energy. The creation of energy through sound can thus translate into creation of electrical energy by one of the most readily available form of pollution. Sound waves are a form of mechanical energy. As per the law of thermodynamics, oscillations of mechanical waves can be converted into electrical energy. We have used the principle of electromagnetic induction, using transducers to convert mechanical into electrical energy. The proposed technique generates electrical energy through readily available sound energy. This technique not only helps in generating electrical energy from noise but also helps in reducing pollution. Production of electricity from available noise pollution as a source is a relatively new concept. The generation of noise pollution, objectionable though it may be, is mostly unavoidable in most circumstances. Therefore, the production of energy from this available sound source can prove to be useful.

II. RELATED WORK

The use of sound to produce electricity is not a new concept. One of the first to achieve this feat was the researchers from Los Alamos National Laboratory in collaboration with the Northrop Grumman Space Technology, USA. They built a compact generator which used the movement of helium gas to generate sound waves that drives a piston to move a coiled Copper wire. However, as the sound in this case was artificially created to generate electricity, it does not transform naturally available or already available sounds and noises present in the environment into electricity. Also the use of a nonrenewable source of energy to create a comparatively less efficient energy source is not a feasible output. Another technique was the use of piezoelectric transducers to convert sound into electrical energy. In this case, the sound generated by various sources was converted into electrical energy and stored in a 9V DC battery. However, the use of piezoelectric material is costly and economically unviable for the purposes of generation. The technique used was noise filtering, and therefore there were excessive losses as the sound was not completely channelized through the Piezo electric material. A method which has taps mechanical energy from the vibration of vehicular movement and converted it into electric energy by piezoelectric effect. However, this technique does not foresee all possibilities, including that the piezoelectric material may be destabilized due to overload.

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III. METHODOLOGY

BACKGROUNDS & CHALLENGES

There are many ways of generating alternative energy coming from sound energy wherein a primary source of electrical energy of the Noise pollution based power bank, one example is through a transducer called the piezoelectric crystal that generates electric charges on its surface when mechanical strain is applied to it and the pressure and sound is transformed in the same manner, as the sound is in a form of vibrations that will be harvested on the piezoelectric material that will be converted into electricity. Piezoelectric materials [1], strengthen the urge for the proponent to think of a way to make use of noise pollution [2] wherein as an environmental hazard and how this type of waste needed recycling to be a useful material for it is available in most of the areas of our developing country [3] . This noise from different locations such as spots near public places, factories, and industries where the sound is clamouring.

The idea of using the power bank as a main device, as it is one of the accessories of cellular phones which is a necessity of today's generation [4], [5] as described about cellular phones being one of the necessities in the present generation and how short the battery life affects the usage of this gadget for communications and entertainment, added to that he introduces the use of power bank as a device which can help give our phones a longer usage span that explained briefly the use of power banks an addition to the accessories of phones that gives extra life to the gadget. It is now being used as the phones nowadays are evolving, having a much wider screen, faster processor and multitasking capabilities, which requires the larger amount of electricity as it is discharging while being used. The possibility of the renewable energy as the power bank's source other than the electricity coming from the convenience outlet [5]. Most of

the projects that have been conducted earlier used solar energy until made a phone charger that used pressure as a source of energy with the help of piezo material to produce electrical energy [6]. The sound can also be a source of energy. This is feasible by the use of some components and equipment that can turn sound or acoustics to mechanical (pressure) and finally produce electrical energy [7]. The process of piezoelectric material and how it can make energy from one form to another. Piezoelectric as a transducer [8], in this research's case, will act as a converter of harvested sound to become electricity with the strain that will be applied to it [9]. The strain will come from the vibration that is carried by the sound waves near the transducer. Due to the technology available, the researchers chose to conduct a study that can help in recycling and produce a device that can help people with their everyday life as long there is a noise or sound energy. Concisely, the proponent decided to develop a noise pollution based power bank. Noise pollution base power bank will convert noise pollution to electricity and store what it has converted for the moment of its need.

This research is developed to make use of noise pollution for a better purpose and improve the use of smartphones and mobile gadgets that are now becoming an essential device for every individual. [10]; [11]; [12] With noise pollution based power bank, pollution could be recycled for many useful purposes. With the use of piezoelectric material, transform sound energy into electrical energy passing through mechanical energy. [13].

COMPONENTS SPECIFICATION

1. Power transformer – 220/12 V
2. Switches
3. Resistors
4. ATMEGA 328P
5. Transducer
6. Connecting wires
7. Screws and Bolts
8. Relays
9. Bridge Rectifier
10. Capacitors
11. Voltage regulator 7812
12. LCD display
13. Transistor

III. FLOW CHART

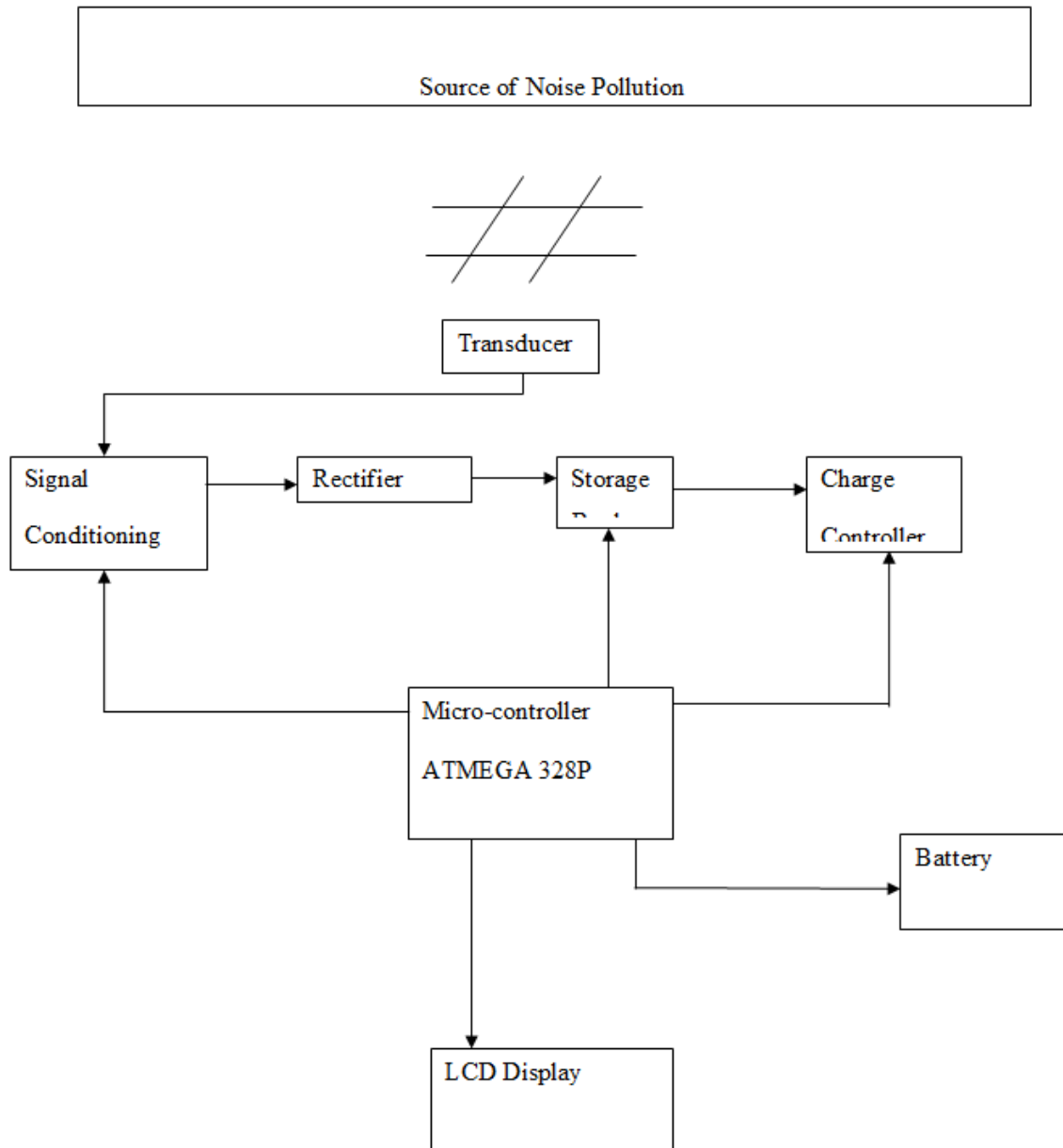


Fig.1.Flow Chart

IV. CONCLUSION

There are multiple sources of sound which go unnoticed, one of them is the noise generated by industries. The use of transducers to convert sound waves (noise pollution) into energy demonstrates that noise can act as an alternative source of energy. It is noted that the values from the motorcycle can be further enhanced as they were taken after the muffling effect of the exhaust pipe. This method further gives way to a here to fore largely unexplored source of clean energy. The results show that as the noise level increases, the corresponding voltage that was measured at the



multimeter also increased. The results further show that there is a non-linear relation between sound energy and the developed voltage. This relationship can be furthered using higher quality equipment. This shows that through a sustainable amount of time, the methods adopted can be used to create sufficient electrical energy that can be successfully stored in a DC battery

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