A

REPORT

OF

CONVERTING SOUND ENERGY TO ELECTRICAL ENERGY

BY

APPLESUNG

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INTRODUCTION

We all are well aware of the crisis of electricity that we, the present generations are facing. If we can non-technically define what sound energy is, we would say it is the most neglected form of energy which is only considered to be a wastage. But the actual scenario is a bit different. Since the population explosion, the consumption of food and space has increased, so has the consumption of electrical energy. So here we convert the energy which is commonly available - sound to the energy which our world is scarce of - electricity.

Since we are actually talking about the conversion of a form of energy to the other, we must remember that the conversion of energy is in accordance with the law of conservation of energy - energy can neither be created nor be destroyed, it can only be changed from one form to the other.

There are 4 parts in this report. The first part deals with the various devices like Saunea 3000 which converts the sound energy to electrical energy. Their exact structure and function has been clearly defined. Part 2 deals with the acoustic sound harvesting that is the way by which sound converted to electricity can be stored and utilized in future. Part 3 talks about the merits and demerits of using this conversion technology.

Finally we conclude that after the population explosion, since the consumption of electricity has been increasing, there is an utter lack in the resources which produce electricity. So sound energy conversion to electricity is one of the best measures that can give the permanent solution to the lack of electricity, in this generation.

PART 1 – A DEVICE THAT CONVERT SOUND ENERGY TO ELECTRICAL ENERGY

Piezoelectric are materials capable of turning mechanical energy into electricity, and can be substances as simple as cane sugar, bones, or quartz. Much research in this field has been focused on transforming the movement of a person running, or even the impact of a bullet, into a small electrical current, but although these advanced applications are not yet available in consumer products, scientists have been using piezoelectric materials in environmental sensors and speakers for years.

Saunea 3000 is device which can convert sound energy to electricity. This a bit different from the other devices because it not only converts sound energy to electricity but also that it has a cell which can store the electricity for future use. We don't require the electrical energy at all times so it is sometimes necessary to store the energy so that it can be used whenever we are lacking electricity.

The Saunea 3000 has a rotatable satellite-dish that is attached to a large diaphragm so that it has a larger surface area to collect sound wave effectively. Underneath the diaphragm is a piezoelectric device. In the middle of the dish, there is a sound sensor which is used detect the direction of the sound. The dish will be directed to face the source of the sound. It has the ability to distinguish between sources with different intensity of sound and adjust accordingly.

The piezoelectric device creates an electrical charge under stress, and thus zinc oxide, was bent into a field of thin wires sandwiched between two electrodes. Zinc oxide is chosen as the material because it is the most efficient synthetic ceramics which exhibits piezoelectric properties and is relatively cheap and easy to obtain.

The outer casing of the Saunea 3000 is made out of carbon fiber which is five times stronger than steel but also lightweight, making it easy to transport.

A Saunea 3000 device can be attached to multiple Saunea 3000 devices via a detachable hinge to form to a bigger device that can produce more electrical energy.

Our product will have two models, one is a fixed and the other is portable. The fixed one can be installed at a place where it will remain stationary for a long period of time. For example, an Airport.

The portable model can be transported from place to place where sound is only present temporarily. For example, a construction site where the Saunea 3000 during period of construction.

PART 2 - ACOUSTIC SOUND HARVESTING AND APPLICATIONS

Acoustic energy is generated and unused all around us. Whether it is the constant hum of an air conditioning unit behind a building, an airplane taking off at the airport or a train departing the station, acoustic energy is cast off as a nuisance or ear sore. Most of these locations try to absorb as much of this energy as possible or are in remote locations so that their customers do not have to be susceptible to the high amount of noise.

Acoustic energy harvesting is the process by which energy is derived from external noise sources, captured and stored. Acoustic energy harvesting is not as popular as the other types of energy harvesting method since sound waves have lower power density. However, in this age of efficiency and alternative energy sources research, acoustic energy harvesting has become something that can't be overlooked since it is one of the vastly available energy sources.

The technique of converting sound energy to electrical energy is ideal for anywhere that attracts crowds, so ticket barriers at subway stations are an obvious application, but the concept will also work at shopping centers, sports venues, concerts, even airport terminals to prevent energy wastage, making the Saunea 3000 the ideal product to be placed at these types of locations.

PART 3 - ADVANTAGES AND DISADVANTAGES OF CONVERSION OF SOUND TO ELECTRICITY

MERITS

- As sound has enormous amount energy with it, it could be used by converting it into electric energy for various purposes
- Sound energy is a mechanical energy so according to law of thermodynamics mechanical energy could be converted into electric energy
- Sound energy could be converted by vibrations on the diaphragm caused by sound waves and by using transducers such as piezoelectric material which converts mechanical strain to electric energy
- Piezoelectric crystals are the crystals which converts mechanical strain to electric energy
- The strain applied to piezoelectric material by sound energy could be converted into electricity
- Lots of research is yet to be done in this aspect, but on a positive note this could surely be done which could solve the energy problem of the entire world
- It doesn't emit any toxic gases and is save for the environment.

DEMERITS

- Lots of work is yet to be done in this field.
- Its efficiency is not that good so improvements are required.
- It is a bit costly but it will be worth it in the end.
- It could not be used in the places where the decibel of sound is very low.

PART 4 - CONCLUSION

One day, we will be able to convert sound energy to electric energy and it could help us to reduce the scarcity of electrical energy globally and help in the development of mankind and reduction of CO2 as electric energy is one of the cleanest energy which can be used anytime of the day as long as there is noise. The noise pollution in the road would be able to convert into electric energy and lights the street lighting, signals and various other electrical appliances. The noise pollution in runway could be used to produce electricity for runway lights. The portable version of it can be transported to any place that provide temporarily noise to be harvested by the machinery, especially in construction sites and road works. And Saunea 3000 will be the leading noise to electrical convertor on the market.

SOURCES

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